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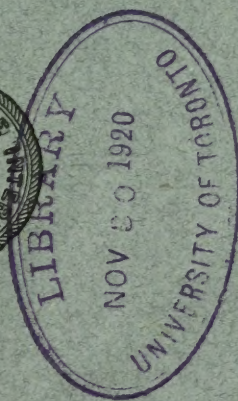
BUREAU OF MINES

FREDERICK G. COTTRELL, DIRECTOR

BIBLIOGRAPHY OF PETROLEUM
AND ALLIED SUBSTANCES
1917

BY

E. H. BURROUGHS



WASHINGTON
GOVERNMENT PRINTING OFFICE.

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BIBLIOGRAPHY OF PETROLEUM AND ALLIED SUBSTANCES, 1917.

By E. H. BURROUGHS.

INTRODUCTION.

This bulletin is the third of the series of yearly petroleum bibliographies being published by the Bureau of Mines. The two preceding, Bulletin 149 and Bulletin 165, were for the years 1915 and 1916, respectively. In arranging the references the same general scheme has been followed, but as in those bulletins, several changes and additions have been made in the classification, the more important being in the classes "Development and production" and "Refining and refineries." German periodicals for 1917 were not procurable and references to articles in those and in other foreign journals that were not available have been credited to the sources from which they were procured.

ACKNOWLEDGMENT.

Acknowledgment is made to C. P. Bowie, M. J. Gavin, C. H. Beal, E. W. Waggy, and F. B. Tough of the petroleum division of the bureau for assistance in arranging the references, and to Miss F. A. Armstrong for the index.

PUBLICATIONS EXAMINED.

SERIALS.

The following list contains the names of the serials examined in preparing this bibliography and the abbreviations used in the text references:

American Chemical Society, journal	Jour. Am. Chem. Soc.
American Gas Engineering Journal (formerly American Gas Light Journal)	Am. Gas. Eng. Jour.
American Institute of Mining Engineers, bulletin	Bull. Am. Inst. Min. Eng.
American Institute of Mining Engineers, trans- actions	Trans. Am. Inst. Min. Eng.
American Journal of Science	Am. Jour. Sci.
American Leather Chemists Association, journal	Jour. Am. Leather Chemists Assoc.

American Mining Congress, proceedings	Proc. Am. Min. Congress.
American Society of Civil Engineers, proceedings	Proc. Am. Soc. Civ. Eng.
American Society of Mechanical Engineers, journal	Jour. Am. Soc. Mech. Eng.
American Society of Naval Engineers, journal	Jour. Am. Soc. Naval Eng.
American Society for Testing Materials, proceed- ings	Proc. Am. Soc. Test. Mate- rials.
Automobile (changed to Automotive Industries, November, 1917)	Automobile.
Automotive Industries. (See Automobile.)	Autom. Ind.
Boletín del Petróleo	Bol. del Petróleo.
California Academy of Sciences, proceedings	Proc. California Acad. Sci.
Canadian Engineer	Canadian Engineer.
Canadian Mining Institute, bulletin	Bull. Canadian Min. Inst.
Canadian Mining Institute, transactions	Trans. Canadian Min. Inst.
Canadian Mining Journal	Canadian Min. Jour.
Chemical Abstracts	Chem. Abs.
Chemical News	Chem. News.
Chemical Society, journal	Jour. Chem. Soc.
Cleveland Engineering Society, journal	Jour. Cleveland Eng. Soc.
Cornell Civil Engineer	Cornell Civ. Eng.
Economic Geology	Econ. Geol.
Engineer	Engineer.
Engineering	Engineering.
Engineering and Contracting	Eng. and Contr.
Engineering and Mining Journal	Eng. and Min. Jour.
Engineering News-Record (consolidation of Engi- neering News and Engineering Record)	Eng. News-Rec.
Engineers' Society of Western Pennsylvania, pro- ceedings	Proc. Eng. Soc. Western Pennsylvania.
Franklin Institute, journal	Jour. Franklin Inst.
Gas Age	Gas Age.
Gas Engine	Gas Engine.
Gas World	Gas World.
Génie Civil	Génie Civil.
Geological Magazine	Geol. Mag.
Geological Society of America, bulletin	Bull. Geol. Soc. Am.
Good Roads	Good Roads.
Horseless Age	Horseless Age.
Industrial Management (formerly Engineering Magazine)	Ind. Management.
Institution of Mining Engineers, transactions	Trans. Inst. Min. Eng.
Institution of Petroleum Technologists, journal	Jour. Inst. Petroleum Tech.
International Marine Engineering	Int. Marine Eng.
Journal of Electricity (formerly Journal of Elec- tricity, Power, and Gas)	Jour. Elec.
Journal of Geology	Jour. Geol.
Journal of Industrial and Engineering Chemistry	Jour. Ind. and Eng. Chem.
Manufacturers Record	Manufac. Rec.
Metallurgical and Chemical Engineering	Met. and Chem. Eng.
Mining and Oil Bulletin	Min. and Oil Bull.
Mining and Scientific Press	Min. and Sci. Press.
Municipal Journal	Munc. Jour.
National Academy of Sciences, proceedings	Proc. Nat. Acad. Sci.

National Fire Protection Association, quarterly	Nat. Fire Protect. Assoc. Quart.
National Petroleum News	Nat. Petroleum News.
Natural Gas and Gasoline Journal	Nat. Gas and Gasoline Jour.
La Nature	La Nature.
Oil Age	Oil Age.
Oil and Gas Journal	Oil and Gas Jour.
Oil, Paint, and Drug Reporter	Oil, Paint, and Drug Rep.
Oil Trade Journal	Oil Trade Jour.
Oildom	Oildom.
Petroleum	Petroleum.
Petroleum Age	Petroleum Age.
Petroleum Review	Petroleum Rev.
Petroleum World	Petroleum World.
Power	Power.
Power Plant Engineering (formerly Practical Engineer)	Power Plant Eng.
Practical Engineer (Changed to Power Plant Engineering, September, 1917)	Prac. Eng.
Railway Age Gazette	Rwy. Age Gaz.
Railway Review	Rwy. Rev.
Resources of Tennessee	Resources of Tennessee.
Revue générale des sciences pures et appliquées	Rev. gén. Sci.
Royal Society of Arts, journal	Jour. Roy. Soc. Arts.
S. A. E. Bulletin (changed to Journal of the Society of Automotive Engineers, July, 1917)	S. A. E. Bull.
Scientific American	Sci. Am.
Scientific American Supplement	Sci. Am. Suppl.
Society of Automotive Engineers, journal	Jour. Soc. Auto. Eng.
Society of Chemical Industry, journal	Jour. Soc. Chem. Ind.
Society of Engineers (London), transactions	Trans. Soc. Eng.
Standard Oil Bulletin	Standard Oil Bull.
Texaco Star	Texaco Star.
University of California, Department of Geology, bulletin	Bull. Univ. California Dept. Geol.
Washington Academy of Sciences, journal	Jour. Wash. Acad. Sci.
Western Engineering	West. Eng.
Western Society of Engineers, journal	Jour. Western Soc. Eng.
Worcester Polytechnic Institute, journal	Jour. Worcester Polytech. Inst.

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Official publications consulted in preparing this bibliography were as follows:

- Bureau of Mines, bulletins and technical papers.
- Bureau of Standards, circulars and technologic papers.
- Corps of Engineers, professional memoirs.
- Geological Survey, bulletins, professional papers, geologic folios, Mineral Resources of the United States for 1915.
- Department of Agriculture, bulletins.
- Department of Commerce, Daily Commerce Reports.
- Such reports of State geological surveys and mining bureaus and foreign geological surveys and mining bureaus as were published in 1917.

SCHEME OF CLASSIFICATION.

The scheme of classification followed in arranging the references is outlined below.

CLASSIFICATION OF SUBJECTS.

MAIN CLASSES.

	Page.
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300 Development and production -----	68
400 Transportation, storage, and distribution -----	78
500 Properties and their determinations -----	85
600 Refining and refineries -----	100
700 Utilization -----	118
800 Legislation and legal regulations -----	140
900 Miscellaneous -----	141

DETAILED OUTLINE OF CLASSIFICATION.

000 General treatises.	
100 Countries and regions.	
(Under each locality follow the classification given under "North America.")	
110 North America -----	
110.001 Historical references and geographic occurrence.	
.002 Geology and origin.	
.003 Development and production.	
.004 Transportation, storage, and distribution.	
.005 Properties and their determination.	
.006 Refining and refineries.	
.007 Utilization.	
.008 Statistics (includes Field development, Crude production, Transportation, storage and distribution, Refineries and refined products, Consumption, Trade reports, Financial and market statistics, General review of the industry.)	
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.12 Kentucky.	
.13 New York.	
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.15 Pennsylvania.	
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.33	Oklahoma.	
.34	Texas (eastern, central, and northern).	
.39	Other States (includes Arkansas, Iowa, Michigan, Minnesota, Missouri, Nebraska, and Wisconsin).	
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UNITED STATES (111).

GEOLOGY AND ORIGIN.

See No. 1480.

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See also Nos. 391, 1480.

^a Figures in parentheses refer to classification numbers; see pages 6-14.

DEVELOPMENT AND PRODUCTION.

See No. 473.

TRANSPORTATION.

7. MORRELL, R. W. Developments in tanker construction. *Petroleum Age*, vol. 4, Nov., 1917, pp. 31-36. *Trans. Soc. Naval Arch. and Marine Eng.*, vol. 25. Outlines especially development of the shelter-deck type of tanker. Discusses shape and arrangement of tanks and standardization of tankers.
8. MORRISON, J. H. Development of American oil tankers. *Internat. Marine Eng.*, vol. 22, March, 1917, pp. 105-107; April, pp. 157-158. A historical account of developments since American oil was first transported to foreign countries in 1864. Changes in 1914 in the policy of the United States Government toward American registry of foreign vessels are discussed, and a summary is given of oil carriers in American service or under construction in United States.

See also No. 543.

PROPERTIES AND THEIR DETERMINATION.

9. ODOM, W. F., and DAVIES, W. W. Comparison of medicinal mineral oils—Russian and American. *Jour. Am. Pharm. Assoc.*, vol. 6, March, 1917, pp. 257-259. Shows that Russian oil, for chemical, clinical, and physical reasons, is better than the American oil now on the market.

See also Nos. 4, 742.

REFINING AND REFINERIES.

10. JAMES, H. G. Refining industry of United States. *Oil and Gas Jour.*, vol. 16, Oct. 18, 1917, pp. 40-42; Oct. 25, pp. 34-36; Nov. 1, pp. 38-39, 46; Nov. 8, pp. 38-39, 46; Nov. 15, pp. 32, 39; Nov. 22, pp. 34, 36; Nov. 29, pp. 35-36, 39; Dec. 6, pp. 38, 40; Dec. 13, pp. 30, 32, 34; Dec. 20, pp. 40, 46; Dec. 27, pp. 36, 38-39. General survey of conditions among refineries of the country, with brief explanations of the most important processes now in use, and of recent progress made toward their perfection. Chiefly statistical.

See also Nos. 33, 34, 35, 36, 37.

UTILIZATION.

11. ROOSEVELT, F. D. The national need of naval petroleum reserves. *Proc. Am. Min. Congress*, vol. 19, 1916 (published 1917), pp. 393-396. Enumerates the advantages of oil-burning vessels in the U. S. Navy, and considers the necessity of a reserve supply of oil in tankage away from the coast in the event of war; of a current supply in tankage at fueling ports; and of a natural underground protected reserve to insure supply for the future of oil-burning ships.
12. SECRETARY OF THE NAVY. Annual report for the fiscal year 1916. Washington, 1917. 78 pp. Discusses (pp. 31-36) the necessity for oil conservation in the United States, the present status of the naval petroleum reserves, and the advantages of oil-burning vessels over those using coal.
13. ——— Annual report for the fiscal year. (Including operations and recommendations to Dec. 1, 1917.) Washington, 1917. 106 pp. Includes a brief discussion (p. 59) of the protection of the oil reserves of the country for use of the Navy.

STATISTICS.

GENERAL REVIEW.

14. DAY, D. T. Petroleum and natural gas. Mineral Industry during 1916 (New York, 1917), pp. 532-567. Statistical review.
15. RICHARDSON, CLIFFORD. Asphalt. Mineral Industry during 1916 (New York, 1917), pp. 69-76. Statistical review.

FIELD DEVELOPMENT, NATURAL GAS.

16. NATURAL GAS AND GASOLINE JOURNAL. Location and description of new wells drilled in Kentucky, Tennessee, Ohio, Pennsylvania, West Virginia, Illinois, Indiana, Kansas, Louisiana, Oklahoma, and Texas. Also gives summary for all fields by districts.

FIELD DEVELOPMENT, OIL AND GAS.

17. OIL AND GAS JOURNAL. Monthly statement gives location and initial production of completed wells, location of drilling wells, and summary for each field, by districts, with comparisons for preceding months.
18. UNITED STATES GEOLOGICAL SURVEY. Mineral Resources of the United States, part 2, Nonmetals. Yearly report of development by States.

IMPORTS AND EXPORTS OF ASPHALT.

IMPORTS AND EXPORTS OF PETROLEUM.

See No. 15.

19. UNITED STATES BUREAU OF FOREIGN AND DOMESTIC COMMERCE. Monthly summary of foreign commerce of the United States.

NEW INCORPORATIONS.

20. NATURAL GAS AND GASOLINE JOURNAL. Monthly statement lists new companies, chiefly natural gas companies, in the United States. January-December, 1917.
21. OIL TRADE JOURNAL. Monthly statement of new charters granted to oil companies in all States. January-December, 1917.
22. PETROLEUM. Monthly list of recent incorporations of petroleum producing, refining, and jobbing concerns, and gas companies in all States. January-December, 1917.

PIPE LINE STATISTICS.

23. OIL AND GAS JOURNAL. Monthly report gives runs, deliveries, and stocks in Kansas-Oklahoma field, Texas panhandle, Caddo district, Louisiana, California, Pennsylvania, and Illinois. January-December, 1917.
24. PETROLEUM AGE. Comparative pipe-line statistics for the United States. Monthly statement of runs, deliveries, gross stocks, and summary by fields. January-December, 1917.
25. UNITED STATES GEOLOGICAL SURVEY. Mineral Resources of the United States, part 2, Nonmetals. Annual statistics.

PRICES.

26. NATIONAL PETROLEUM NEWS. Weekly statement of prices of crude petroleum in all fields. January-December, 1917.
27. OIL AGE. Monthly report of prices of crude oil in all fields, and of refined products of petroleum in Los Angeles. January-December, 1917.
28. OIL AND GAS JOURNAL. Weekly report of prices throughout the United States. January-December, 1917.
29. OIL TRADE JOURNAL. Monthly statement of crude and fuel oil prices. January-December, 1917.
30. PETROLEUM. Monthly report of prices in all fields. January-December, 1917.
31. UNITED STATES GEOLOGICAL SURVEY. Mineral Resources of the United States, part 2, Nonmetals. Annual report gives fluctuations in price for each field throughout the year.

PRODUCTION.

32. UNITED STATES GEOLOGICAL SURVEY. Mineral Resources of the United States, part 2, Nonmetals. Annual report of output and value of petroleum, natural gas, natural-gas gasoline, and asphalt, by States.

REFINING AND REFINERIES.

33. BUREAU OF THE CENSUS. Abstract of the census of manufactures, 1914. Washington, 1917. 721 pp. Includes statistics of the petroleum refining industry.
34. ———. Census of Manufactures: 1914. Petroleum, refining. Washington, 1917. 13 pp. Gives summary and analysis, with general data compiled for the industry; special tables relating to materials, products, and methods of manufacture; and State comparisons for 1904, 1909, and 1914, and detailed statistics by States for 1914.
35. EGLOFF, CUSTAV. Output of gasoline due to cracking. Oil and Gas Jour., vol. 16, Dec. 20, 1917, p. 42. From figures of refinery products by the Bureau of Mines (See No. 37), calculates percentages of straight-run and cracked gasoline for 1916 and half of 1917, on the basis of the total crude refined and on the basis of the total gasoline marketed.
36. NATIONAL PETROLEUM NEWS. Gasoline yield for 1917 is 20 per cent of crude. Vol. 9, November, 1917, p. 15. Gives refinery operations for the first six months of 1917, by months and by fields, and adds a table of percentages of products produced to crude oil run in the first six months of 1917.
37. OIL AND GAS JOURNAL. Figures covering supply of gasoline. Vol. 16. Nov. 8, 1917, p. 34. Quotes Bureau of Mines figures, gives refinery operations for the first six months of 1917, by months and by fields, and for the whole of 1916, by fields.

See also Nos. 10, 47.

TANKAGE.

- 38-39. PETROLEUM AGE. Monthly statement gives summary of oil in tankage, by fields. January-December, 1917.

LEGAL REGULATIONS.

- 40-41. UNITED STATES CONGRESS, HOUSE, COMMITTEE ON PUBLIC LANDS. Exploration for and disposition of coal, oil, gas, etc. Report to accompany H. R. 3232. Washington, 1917. 11 pp. 65th Cong., 2d sess. House Rept. No. 206. Submitted by Mr. Ferris.

42. UNITED STATES CONGRESS. SPECIAL JOINT COMMITTEE ON GENERAL LEASING BILL. General leasing bill. Proceedings of the special joint conference of the Committees on Public Lands, United States Congress, and representatives of the Departments of Justice, Navy, and Interior, Sixty-fourth Congress, 2d sess., on H. R. 406, an act to authorize exploration for and disposition of coal, phosphate, oil, gas, potassium, or sodium. Printed for the use of the Senate Committee on Public Lands. Washington. 1917. 144 pp. *See also* Nos. 190, 1459-1464.

ECONOMICS.

43. ARNOLD, RALPH. General condition of the petroleum industry and the world's future supply. *Bull. Geol. Soc. Am.*, vol. 28, Sept., 1917, pp. 603-616. Outlines present conditions in the oil industry and the problems confronting it, particularly that of future supply. Discusses future sources of oil by countries, in geographic order, beginning with North America.
44. ———. The world's oil supply. *Proc. Am. Min. Congress*, vol. 19, 1916 (published 1917), pp. 473-490. Outlines the status and possibilities of the oil industry in the most important producing countries of the world (Canada, United States, Mexico, Central America, West Indies, Colombia, Ecuador, Peru, Bolivia, Argentina, Great Britain, France, Germany, Italy, Austria, Roumania, Russia, Turkey, Persia, Arabia, India, China, Dutch East Indies, Philippine Islands, Japan, Africa), and shows that the supply is restricted and should be carefully conserved.
45. BEDFORD, A. C. Oil in the war. *Oildom*, vol. 7, October, 1917, pp. 483-484, 486, 488. Address, "Priority and distribution," under the general heading, "How American industry can help win this war," at convention of business men, September, 1917. Reviews the situation as to supply and demand of American petroleum and its products, and suggests policies which should insure a sufficient supply for the needs of the war.
46. CLAPP, F. G. Remedies for the petroleum and gasoline situation. *Eng. and Min. Jour.*, vol. 104, Aug. 4, 1917, pp. 196-201. Discusses the present shortage and various remedies, such as the use of substitutes, of foreign oils and of shale oils, and the discovery and development of new fields, the last two affording the only permanent remedy. Suggests that new development be under the supervision of an efficient organization of geologists.
47. FEDERAL TRADE COMMISSION. Report on the price of gasoline in 1915. Washington. 1917. 224 pp. Considers in detail the various factors of the rise in price, such as demand and supply, costs and margins, earnings and dividends, inequalities in competition and price, retail prices and margins, and the position of the Standard companies in the industry. Recommendations are made for common ownership, pipe-line control, publicity of statistics, and quality of product. Numerous curves and statistical tables are given.
- 47a. NORTHRUP, J. D. Petroleum. *U. S. Geol. Survey Bull.* 666-DD, 1917. 13 pp. Advance chapter of Bulletin 666, "Our Mineral Supplies," which discusses the important minerals of the United States as to supply, uses in peace and in war, normal demand and probable demand in war. This chapter takes up the petroleum industry, domestic sources of petroleum, and the influence of the war on the industry.
48. WILLIAMS, W. A. Present and future in oil. *Oildom*, vol. 7, October, 1917, pp. 494, 496. Discusses present and future demands on the petroleum industry, and possible remedies for shortage of crude oil and its products.

APPALACHIAN FIELD.

HISTORICAL REFERENCES AND GEOGRAPHIC OCCURRENCE.

49. ASHLEY, G. H. Oil resources of black shales of the eastern United States. U. S. Geol. Survey Bull. 641, 1917, pp. 311-324. Published also as separate Bull. 641-L, 1917. Abstract in Jour. Wash. Acad. Sci., vol. 7, Nov. 4, 1917, pp. 564-565. Results of an investigation of shales in several eastern States to determine their content of oil and consequent commercial possibilities. Gives occurrence of the shale in these States, describes samples taken, and gives table of distillation test of the samples.

GEOLOGY AND ORIGIN.

50. FULLER, M. L. Appalachian oil field. Bull. Geol. Soc. Am., vol. 28, September, 1917, pp. 617-654. Gives historical summary of the oil industry in the Appalachian field by States; describes the geology of each State of the field; discusses the origin of the oil in the field, and the relations of Appalachian oil to structure; gives production statistics and discusses the future of the field and the influence of various important factors on its future development.
51. JOHNSON, R. H., and HUNTLEY, L. G. Nature's wonderfully prolific reservoirs. Oil City Derrick Supplement, Dec. 15, 1917, pp. 3, 5. How practical geology resulted in the development of oil in the eastern United States. Principal fields briefly described.

See also No. 50.

DEVELOPMENT AND PRODUCTION.

52. MILLS, R. V. A., and WELLS, R. C. The evaporation of water at depth by natural gases. Jour. Wash. Acad. Sci., vol. 7, May 19, 1917, pp. 309-310. (Abstract.) A study of the changes in Appalachian oil-field waters during the production of petroleum and natural gas, with conclusions upon the origin of oil-field brines and salt domes.
53. REEVES, FRANK. The absence of water in certain sandstones of the Appalachian oil fields. Econ. Geol., vol. 12, June, 1917, pp. 354-378. Discussion, October-November, pp. 610-628, by E. W. Shaw. Summary: "There seems to be good evidence that the nonwater-bearing sandstones of the Catskill formation in southwestern Pennsylvania and West Virginia were dried out by the semiarid condition which existed during Catskill time, which also brought about the formation of continental 'red beds.' In addition to this conclusion and partly resulting from it, the statement can be made that the facts observed do not substantiate the idea held by some geologists that there is a disappearance of water with depth. It is quite likely also that the brines found in oil fields and other deep-seated sedimentary strata are connate waters."
54. ———. Origin of the natural brines of oil fields. Johns Hopkins Univ. Circular, new series, No. 3, March, 1917, pp. 57-68. Results of a study of the brines found in the Appalachian oil sands, with the conclusion that they are connate or of ocean origin, and not of meteoric or surface origin.
55. RICHARDSON, G. B. Note on Appalachian oil-field brine. Econ. Geol., vol. 12, January, 1917, pp. 39-41. Gives analyses of waters from deep Pennsylvania sands, and discusses briefly the factors controlling their composition.
56. ———. Note on the diffusion of sodium chloride in Appalachian oil-field waters. Jour. Wash. Acad. Sci., vol. 7, 1917, pp. 73-75. Study of water from deep wells of western Pennsylvania.

PROPERTIES AND THEIR DETERMINATION.

See No. 49.

STATISTICS.

57. **PETROLEUM AGE.** Monthly statement shows average daily production and shipments in the Appalachian and Lima-Indiana fields, by months for five successive years.

See also Nos. 14-18, 20-38, 50.

INDIANA.

GEOLOGY AND ORIGIN.

- 57a. **BARRETT, EDWARD.** Structural geology. Indiana Dept. Geol. and Nat. Resources, Forty-first Annual Rept., 1916 (Indianapolis, 1917), pp. 100-112. Classifies and describes oil-field structures, and reviews field development in Indiana during 1916.
58. **BOWNOCKER, J. A.** Petroleum in Ohio and Indiana. Bull. Geol. Soc. Am., vol. 28, September, 1917, pp. 667-676. Describes the principal oil-producing rocks of Ohio and Indiana, the Trenton limestone field, and the Clinton sand field. Discusses Corniferous rocks as a source of oil in Indiana, and the Mississippian and Pennsylvanian as sources of petroleum in Ohio and Indiana.
- 58a. **WRIGHT, F. E.** Oil and gas. Indiana Dept. Geol. and Nat. Resources, Forty-first Annual Rept., 1916 (Indianapolis, 1917), pp. 114-121. Suggests changes in the State law in regard to shutting off water, plugging and abandoning wells, and drilling in coal areas.

STATISTICS.

See Nos. 14-18, 20-38.

KENTUCKY.

GEOLOGY AND ORIGIN.

59. **BELL, GUY.** Petroleum prospects in Kentucky. Oil and Gas Jour., vol. 16, Oct. 25, 1917, pp. 42-43. Gives geologic facts in regard to prospective oil areas of eastern Kentucky.
60. **GARDNER, J. H.** Kentucky as an oil State. Science, vol. 46, Sept. 21, 1917, pp. 279-280. Discusses future production and its dependence on four factors—structure, sand, water, and original oil. Concludes that the State will not rank high in production but valuable deposits may be found.
61. **JONES, J. W.** Report on Estill County oil fields. Oil and Gas Jour., vol. 15, Apr. 5, 1917, pp. 30-31. Gives geologic structure, topographic description, operating methods, and pipe-line facilities.
62. **MILLER, A. M.** Table of geological formations for Kentucky. Lexington, Ky., 1917. 7 pp.
63. **NATIONAL PETROLEUM NEWS.** Find five oil-bearing strata in Kentucky. Vol. 9, October, 1917, pp. 98-99. Describes anticlines in eastern part of the State.
64. **PETROLEUM AGE.** Kentucky to be wildcatters' paradise. Vol. 4, February, 1917, pp. 24a-24d. Describes present conditions of development and future prospects of the Irvine pool.
65. **SEARS, M. A.** Paint Creek Dome in eastern Kentucky. Oil and Gas Jour., vol. 15, May 31, 1917, pp. 30, 35. A geological description of the region, and history of its development.

66. SHAW, E. W. The Irvine oil field, Estill County, Ky. U. S. Geol. Survey Bull. 661-D, 1917. 51 pp. A detailed geological study of the field, with suggestions for prospecting. Gives statistics of production, well data, analysis of the oil, and the composition of Ohio black shale found in the Irvine field. Abstract in Jour. Wash. Acad. Sci., vol. 7, Oct. 4, 1917, p. 514.
- DEVELOPMENT AND PRODUCTION, *see* Nos. 61, 66; TRANSPORTATION, *see* No. 61; PROPERTIES AND THEIR DETERMINATION, *see* No. 66; REFINING AND REFINERIES, *see* No. 173; STATISTICS, *see* Nos. 14-18, 20-38, 66.

NEW YORK.

GEOLOGY AND ORIGIN, *see* No. 74.

PROPERTIES AND THEIR DETERMINATION.

67. ENGINEERING AND CONTRACTING. New York specifications for emulsified asphalt. Vol. 48, July 4, 1917, p. 9. Specifications of the State Commissioner of Highways of New York, 1916.
68. NATIONAL PETROLEUM NEWS. How New York City buys its lubricants. Vol. 8, January, 1917, pp. 26-30. Tells of specifications drawn up by the municipal bureau of standards for lubricating oils for the city. Quotes specifications for motor oils.
- UTILIZATION, *see* Nos. 67, 68; STATISTICS, *see* Nos. 14-18, 20-38.

OHIO.

GEOLOGY AND ORIGIN.

69. GOLDMAN, M. I. Results of the microscopic examination of some rocks from the oil fields of southeastern Ohio. Jour. Wash. Acad. Sci., vol. 7, May 19, 1917, pp. 310-311. (Abstract.) Results of an investigation "to find any characters of the rocks that might bear on the distribution of oil in them," and of a study of the early stages of metamorphism and their relation to geologic conditions.
70. GRABAU, A. W. Age and stratigraphic relations of the Olentangy shale of central Ohio, with remarks on the Prout limestone and so-called Olentangy shales of northern Ohio. Jour. Geol., vol. 25, May-June, 1917, pp. 337-343.
71. PANYITY, L. S. The southern extremity of the "Clinton" gas pools in Ohio. Bull. Am. Inst. Min. Eng., June, 1917, pp. 963-967. Trans., vol. 57, 1918, pp. 984-988. Geological description of this region, and account of oil and gas development. Eng. and Min. Jour., vol. 104, Aug. 4, 1917, pp. 207-208. (Abstract.)
72. ROGERS, G. S. The Cleveland gas field, Cuyahoga County, Ohio, with a study of gas pressure. U. S. Geol. Survey Bull. 661-A, 1917. 68 pp. Gives history and development of the field, stratigraphy and structure, gas resources, and a detailed discussion of the decline of wells and the factors controlling production and life. Abstract, Jour. Wash. Acad. Sci., vol. 7, May 19, 1918, p. 308.
73. VAN HORN, F. R. Reservoir gas and oil in the vicinity of Cleveland, Ohio. Bull. Am. Inst. Min. Eng., January, 1917, pp. 75-86; discussion, April, pp. 621-622. Transactions, vol. 56, 1917, pp. 831-842. After an explanation of the difference between shale gas and reservoir gas, a historical outline of the development of the latter is given, and an account of present developments in Ohio. The chief producing sands are described, and logs of representative wells are given, as well as analyses of gas and distillation tests of oil from wells in the Cleveland district.

74. VERWEIBE, W. A. Correlation of the Devonian shales of Ohio and Pennsylvania. *Am. Jour. Sci.*, vol. 44, July, 1917, pp. 33-47. Concludes that such correlation is a difficult problem, because paleontology and lithology are unsatisfactory guides; that the 750 feet of shales in central Ohio expand and are stratigraphically equivalent to the 2,700 feet of shale in western Pennsylvania; that the shales of Ohio should be subdivided into two parts rather than three—the upper predominately black colored, and lower predominately light colored; and gives correlation table of the various subdivisions in Ohio and Pennsylvania with those of New York.
75. ——— Correlation of the Mississippian of Ohio and Pennsylvania. *Am. Jour. Sci.*, vol. 43, April, 1917, pp. 301-318. A detailed study of these formations. Their correlation is a problem not yet satisfactorily worked out. This paper attempts to correlate them in these two areas preliminary to a discussion of the Devonian. Numerous sections are given.

See also No. 58.

TRANSPORTATION, *see* No. 549; PROPERTIES AND THEIR DETERMINATION, *see* No. 763.

UTILIZATION.

76. WYER, S. S. Ohio's fuel savings. *Nat. Gas and Gasoline Jour.*, vol. 11, April, 1917, p. 80. Considers the cost of substitutes for natural gas fuel, such as coal gas, coke-oven gas, water gas, electricity, fuel oil, gasoline, alcohol, and acetylene.

STATISTICS, *see* Nos. 14-18, 20-38.

LEGAL REGULATIONS, ECONOMICS.

77. INDUSTRIAL COMMISSION OF OHIO. BULLETIN. Oil and gas well law of Ohio. Vol. 4, No. 7, June 1, 1917. 10 pp. Gives laws of the State governing the drilling, mapping, and plugging of wells in coal-bearing townships.
78. LANTZ, G. N. Oil and gas wells in coal fields. *Coal Age*, vol. 11, Feb. 10, 1917, pp. 285-286. Suggests Ohio laws on this subject as basis for future laws for Pennsylvania.

See also No. 80.

79. MCKIBBEN, G. L. The natural gas situation in Cleveland during the winter of 1916-17. *Jour. Cleveland Eng. Soc.*, vol. 10, September, 1917, pp. 113-125. Data on present and probable future production and consumption, with a view to finding a plan of action by consumers and companies to obtain satisfactory service.
80. PRITCHARD, J. H. Review of coal mining for 1916, Ohio. *Coal Age*, vol. 11, Jan. 13, 1917, pp. 54-57. Includes statement of the Ohio law which regulates the drilling of oil and gas wells in coal fields.

PENNSYLVANIA.

GEOLOGY AND ORIGIN, *see* Nos. 74, 75.

DEVELOPMENT AND PRODUCTION.

81. GRAY, A. R. Deep well drilling. *Proc. Nat. Gas. Assoc. Am.*, vol. 9, 1917, pp. 382-397; discussion, pp. 397-398. *Nat. Gas and Gasoline Jour.*, vol. 11, August, 1917, pp. 216-222. Describes deep wells in Pennsylvania and West Virginia, with details and well records.
82. OIL AND GAS JOURNAL. Drilling log of deep well at McDonald, Pa. Vol. 15, Mar. 8, 1917, p. 36. Gives log to 7,214 feet.
83. ——— Flooding of wells in Bradford field. Vol. 15, Feb. 22, 1917, p. 28. Describes method used in the Bradford field to force out dormant oil which is estimated as 25 per cent of the original content of the sand.

84. REEVES, FRANK. Origin of the natural brines of oil fields. Johns Hopkins Univ. Circular, new series, March, 1917, pp. 57-68. Contributions to Geology, 1917, pp. 255-266. Shows that the brines of Pennsylvania and West Virginia are of connate rather than meteoric origin.
See also Nos. 53, 54, 55, 56.

TRANSPORTATION, STORAGE, AND DISTRIBUTION.

85. BERNARD, H. B. Natural gas pumping station at Roystone. Power, vol. 45, Apr. 17, 1917, pp. 514-516. Gives details of system operated by the Pennsylvania Gas Co. at Roystone, Pa.
 STATISTICS, *see* Nos. 14-18, 20-38; LEGAL REGULATIONS, *see* No. 78.

WEST VIRGINIA.

GEOLOGY AND ORIGIN.

86. HENNEN, R. V. Clay and Braxton Counties. West Virginia Geol. Survey, County Reports, 1917. 883 pp. Accompanied by case of geologic and topographic maps. Chapter IX (pp. 278-454), on petroleum and natural gas, contains descriptions of the oil and gas horizons and oil and gas-bearing sands in these counties, detailed well records for each county, and locations of prospective oil and gas areas.
 87. REGER, D. B. The possibility of deep-sand oil and gas in the Appalachian geo-syncline of West Virginia. Trans. Am. Inst. Min. Eng., vol. 56, 1917, pp. 856-871; discussion, pp. 872-875. Published first in Bull. Am. Inst. Min. Eng., September, 1916, pp. 1709-1724; discussion, April, 1917, pp. 622-626.

DEVELOPMENT AND PRODUCTION.

88. FANNING, L. M. Ohio Cities Gas Co.'s refinery and oil producing properties at Cabin Creek, W. Va. Oil Trade Jour., vol. 8, November, 1917, pp. 50-55. Describes refinery equipment and interesting operating features, and gives cost of construction and shipping facilities. Describes the company's producing properties, and gives data on cost of labor, materials, and drilling.
 89. NATURAL GAS ASSOCIATION OF AMERICA. Report of the committee on conservation. Proceedings, vol. 9, 1917, pp. 323-330. Discusses conservation of natural gas, the mudding process, and the recovery of natural-gas gasoline in West Virginia, Oklahoma, and Kansas.

See also Nos. 53, 54, 81, 84, 86.

REFINING AND REFINERIES, *see* No. 88; STATISTICS, *see* Nos. 14-18, 20-38.

MAPS.

90. WEST VIRGINIA GEOLOGICAL SURVEY. Coal, oil, gas, limestone, and iron-ore map. Oct. 1, 1917. Revised edition. Shows oil and gas pools of the State.
See also No. 86.

ILLINOIS FIELD.

ILLINOIS.

GEOLOGY AND ORIGIN.

91. BLATCHLEY, R. S. Plymouth oil field. Illinois Geol. Survey, Bull. 23, 1917, pp. 51-53. Gives history of discovery of oil in this field, well records, and recommendations by the survey.

92. BROKAW, A. D. Oil investigations in Illinois in 1916. Parts of Saline, Johnson, Pope, and Williamson Counties. Illinois Geol. Survey, Bull. 35, 1917, pp. 19-37. Published also as separate, in abbreviated form, 1916. A geologic study of the region in relation to the accumulation of oil and gas, with recommendations for future drilling.
93. BUTTS, CHARLES. Oil investigations in Illinois in 1916. Parts of Hardin, Pope, and Saline Counties. Illinois Geol. Survey Bull. 35, 1917, pp. 75-78. Gives stratigraphy and structure of the region, with map, and locates possible oil-bearing strata.
94. HINDS, HENRY. Geology and economic resources of Colchester and Macomb quadrangles. Illinois Geol. Survey, Bull. 30, 1917, pp. 75-108.
95. ——— Oil and gas in Colchester and Macomb quadrangles. Illinois Geol. Survey, Bull. 23, 1917, pp. 45-50. Describes geology of these quadrangles, and oil and gas deposits. Geological map is appended.
96. KAY, F. H. Oil fields of Illinois. Bull. Geol. Soc. Am., vol. 28, September, 1917, pp. 655-666. Describes stratigraphy and structure of the field, and conditions which affect accumulation and oil content per acre, with table of total production per acre for typical areas.
97. ——— Oil investigations in Illinois in 1916. Illinois State Geol. Survey Bull. 35, 1917. 78 pp. Includes the following reports: Petroleum in Illinois in 1916, by F. H. Kay; Parts of Saline, Williamson, Pope and Johnson Counties, by A. D. Brokaw; Parts of Williamson, Union, and Jackson Counties, by Stuart St. Clair; The Ava area, by Stuart St. Clair; The Centralia area, by Stuart St. Clair; Parts of Hardin, Pope, and Saline Counties, by Charles Butts. See also separate authors.
98. ST. CLAIR, STUART. Oil investigations in Illinois in 1916. Parts of Williamson, Union, and Jackson Counties. Illinois Geol. Survey, Bull. 35, 1917, pp. 39-55. Results of a reconnaissance of the territory to determine general structure, and to map the position and extent of areas where structural irregularities indicated possible accumulation of oil and gas. Gives geologic description, with diagrams and maps, and recommendations for drilling.
99. ——— Oil possibilities of Ava area. Illinois Geol. Survey, Bull. 35, 1917, pp. 57-65. A study of the structural relations of the area, with cross sections and map, a record of former drilling operations, and recommendations as to future drilling.
100. ——— Oil possibilities of Centralia area. Illinois Geol. Survey, Bull. 35, 1917, pp. 67-73. Geologic study of the area, with recommendations for drilling for oil and gas.

DEVELOPMENT AND PRODUCTION, *see* No. 96.

STATISTICS.

101. KAY, F. H. Petroleum in Illinois in 1916. Illinois Geol. Survey, Bull. 35, 1917, pp. 11-18. Statistical review of field development, production, and prices in Illinois during 1916.
102. SKEWES, H. J. Mineral resources in Illinois in 1911 and 1912. Illinois Geol. Survey Bull. 23, 1917, pp. 25-44. Statistics on petroleum, natural gas, and gasoline.
103. ——— Mineral resources of Illinois in 1913 and 1914. Illinois Geol. Survey, Bull. 30, 1917, pp. 23-49. Includes statistics of petroleum, natural gas, asphalt, and casing-head gasoline. Tables give the history of oil production since 1889, and the fluctuation in prices for the years 1912-1914.

See also Nos. 14-18, 20-38.

MID-CONTINENT FIELD.

GEOLOGY AND ORIGIN.

104. GARDNER, J. H. The Mid-Continent oil fields. Bull. Geol. Soc. Am., vol. 28, September, 1917, pp. 685-720. Gives the stratigraphy and structure of the field, by States. Discusses the origin of Mid-Continent oil and the accumulation of oil and gas in the field. Enumerates and discusses important factors which create an oil field. Gives quality and analyses of the petroleum of each State in the field.
105. ——— The vertical component in local folding. Bull. Southwestern Assoc. Petroleum Geologists, vol. 1, 1917, pp. 107-109; discussion, pp. 109-110. Presents theory of vertical rather than lateral pressures in the folding of stratified rocks, and applies it especially to Mid-Continent oil-field structures.
106. HAGER, DORSEY. A few notes on the future work of the petroleum geologist in the Mid-Continent oil fields. Bull. Am. Inst. Min. Eng., October, 1917, pp. 1793-1795. Trans., vol. 57, 1918, pp. 891-893. States that chances of finding new pools in Kansas and Oklahoma are slight, therefore future work will consist of the development and extension of areas already proved productive. Points out importance of cooperation between geologist and operator.
107. NOWLAN, H. H. Geology of the Mid-Continent field. Oil City Derrick Supplement, Dec. 15, 1917, pp. 85-87, 91. General character of rock formations and types of structure found in this field.

DEVELOPMENT AND PRODUCTION.

108. STRAIGHT, H. R. Methods of drilling used by the Empire Gas & Fuel Co. in the Mid-Continent field. Doherty News, vol. 3, December, 1917, pp. 5-9. Explains cable tool, rotary, circulating, and combination systems of drilling. Describes methods used in the Kansas fields, such as the use of portable drilling machines for shallow wells. Discusses the problems of finding the best method of drilling in the soft Permian beds of western Oklahoma, and of drilling in the Pennsylvanian beds with less casing than usually is employed.
- TRANSPORTATION, *see* No. 591; PROPERTIES AND THEIR DETERMINATION, *see* No. 104; STATISTICS, *see* Nos. 14-18, 20-38.

KANSAS.

HISTORICAL REFERENCES.

109. HAWORTH, ERASMUS. Historical outline of the oil and gas industry in Kansas. Kansas Geol. Survey Bull. 3, 1917, pp. 19-24. An outline of the history of the development of oil and gas in Kansas, which was published in vol. 9 of University Geological Survey, 1908, followed by a description of recent oil development through half of 1917.

GEOLOGY AND ORIGIN.

110. HINDS, HENRY, and GREENE, F. C. Leavenworth-Smithville Folio, Missouri-Kansas. U. S. Geol. Survey Geologic Atlas of the United States, Folio No. 206, 1917. Discusses in detail geology, mineral resources, and occurrence of oil and gas.

111. MOORE, R. C., and HAYNES, W. P. Oil and gas resources of Kansas. Kansas Geol. Survey Bull. 3, 1917. 391 pp. After chapters on the general geology of oil and gas and their important properties, and on production methods used in Kansas, gives the general stratigraphy of Kansas, with a description of the crystalline rocks of the State. Discusses present development in the oil and gas fields, and possible development in all parts of the State. The law relating to oil and gas in Kansas is appended. Chapters are given on the history of the oil and gas industries in Kansas by Erasmus Haworth, and on the physical and chemical properties of Kansas petroleum by W. A. Whitaker, F. W. Campbell, and Clarence Estes.
112. POWERS, SIDNEY. Granite in Kansas. Am. Jour. Sci., vol. 44, August, 1917, pp. 146-150. Considers the age and formation of granite deposits found in wells drilled in Kansas. Gives list of wells in which granite was encountered, their location, and the depths at which the rock was found. (See also Haworth, Erasmus, on crystalline rocks in Kansas. Kansas Univ. Geol. Survey, Bull. 2, 1915. 33 pp.)
113. TAYLOR, C. H. The granites of Kansas. Bull. Southwestern Assoc. Petroleum Geologists, vol. 1, 1917, pp. 111-125; discussion, pp. 125-126. Statement of occurrence, discussion of structural relations, and age of granite deposits found in east-central Kansas in drilling for oil and gas. Gives list of wells in which granite was found, and two well logs.
114. TWENHOFEL, W. H. Granite boulders in (?) the Pennsylvanian strata of Kansas. Am. Jour. Sci., vol. 43, May, 1917, pp. 363-380. Gives distribution, lithology, and characteristics of boulders found in Wilson and Woodson Counties, with a view to explaining the occurrence of granite in deep wells in this vicinity. (See also Haworth, Erasmus. On crystalline rocks in Kansas. Kansas Geol. Survey Bull. 2, 1915.) Gives also their stratigraphy and probable geologic history.
115. WRIGHT, PARK. Granite in Kansas wells. Bull. Am. Inst. Min. Eng., August, 1917, pp. 1113-1120. Trans., vol. 57, 1918, pp. 906-913. Offers a theory for the presence of the granite, and draws conclusions which will aid in determining the prospective oil and gas value of the area studied. *See also* Nos. 104, 239, 399.

DEVELOPMENT AND PRODUCTION.

116. SHALLENBERGER, G. C. Water problem in Augusta oil field. Oil and Gas Jour., vol. 15, Mar. 8, 1917, p. 28. Discusses the application of the science of hydrostatics in attempting to solve the problem of water intrusion in oil wells of this field. *See also* Nos. 89, 108, 111.

PROPERTIES AND THEIR DETERMINATION.

117. WHITAKER, W. A., CAMPBELL, F. W., and ESTES, CLARENCE. The physical and chemical properties of Kansas petroleum. Kansas Geol. Survey Bull. 3, 1917, pp. 174-192. Reviews previous work on this subject, gives methods used in the present investigation, and data obtained. *See also* No. 104, 111.

REFINING AND REFINERIES, *see* No. 89.

STATISTICS.

118. BOYNTON, A. J. The economic resources of the Kansas City zone. Jour. Ind. and Eng. Chem., vol. 9, July, 1917, pp. 700-705. Includes short statistical reviews of the oil and gas industries of this region. *See also* Nos. 14-18, 20-38.
- MAPS, *see* No. 110; LEGAL REGULATIONS, *see* No. 111.

LOUISIANA, NORTHERN.

GEOLOGY AND ORIGIN.

119. MATSON, G. C., and HOPKINS, O. B. The De Soto-Red River oil and gas field, Louisiana. U. S. Geol. Survey Bull. 661-C, 1917. 40 pp. Gives stratigraphy and structure of the field, and describes in detail the oil and gas-bearing formations. Discusses the relation of the occurrence of oil and gas to the structure of the sands and associated formations. Gives analyses of the oil and gas found in this field, and statistics of production.
120. PALLFELT, H. A. The petroleum industry in Louisiana. Proc. Louisiana Eng. Soc., vol. 3, February, 1917, pp. 17-32. Oildom, vol. 7, April, 1917, pp. 170, 172. Gives briefly the geologic formations of the fields, and the occurrence of oil and gas, and reviews the development of the industry in the State.

See also No. 104.

PROPERTIES AND THEIR DETERMINATION, *see* Nos. 104, 119.

STATISTICS.

PRODUCTION.

121. Oil Trade Journal. Texas and Louisiana output. Monthly statement. *See also* Nos. 14-18, 20-38, 119.

LEGAL REGULATIONS.

122. DEPARTMENT OF THE INTERIOR. Report of the Commissioner of the General Land Office to the Secretary of the Interior for the fiscal year ended June 30, 1917. Washington, 1917. 149 pp. Contains (pp. 3-13) a review of the oil land situation in California, Wyoming, and Louisiana (Caddo Lake lands).

OKLAHOMA.

GEOLOGY AND ORIGIN.

123. AURIN, FRITZ. Correlation of the oil sands of Oklahoma. Oklahoma Geol. Survey Circular 7, October, 1917. 16 pp. Incorporated also in Oklahoma Geol. Survey Bull. 19, part 2, 1917. (See No. 138.) Discusses the use of well logs in correlating sands, and general problems in the correlation of sands in the Pennsylvanian. Describes the main productive horizons of the State. Concludes with the logs of several wells, which show the general characteristics of the oil and gas fields of Oklahoma.
124. BEAL, C. H. Geologic structure in the Cushing oil and gas field, Oklahoma, and its relation to the oil, gas, and water. U. S. Geol. Survey Bull. 658, 1917. 64 pp. Prepared in cooperation with the Bureau of Mines. Abstract in Bull. Am. Inst. Min. Eng., August, 1917, pp. 1101-1112. Trans. Am. Inst. Min. Eng., vol. 57, 1918, pp. 894-905. Results of a study of the formations containing oil, gas, and water, and the relations of these substances in the formations, with a view to aiding in the work of conservation of oil and gas in this and other fields by showing the value of geology in developing and operating a field.
125. BLOESCH, EDWARD. North-south correlation of the Pennsylvanian of Oklahoma. Bull. Southwestern Assoc. Petroleum Geologists, vol. 1, 1917, pp. 134-135.

126. BLOESCH, EDWARD. Observations in the post-Permian deposits in north-central Oklahoma. *Bull. Southwestern Assoc. Petroleum Geologists*, vol. 1, 1917, pp. 136-139. Results of a study of the structural geology of Garfield and surrounding counties.
127. CONKLING, R. A. The influence of the movement in shales on the area of oil production. (Cushing field, Oklahoma.) *Trans. Am. Inst. Min. Eng.*, vol. 56, 1917, pp. 876-879; discussion, pp. 879-880. Published also in *Bull. Am. Inst. Min. Eng.*, November, 1916, pp. 1969-1972; discussion, March, 1917, pp. 389-390; April, 1917, p. 620; June, 1917, p. 985.
128. FATH, A. E. An anticlinal fold near Billings, Noble County, Okla. *U. S. Geol. Survey Bull.* 641, 1917, pp. 121-138. Published also as separate *Bull.* 641-E, 1916. The geology and formation of the anticline are described relative to the possibilities of oil and gas, which are found 20 miles from the anticline. Gives well records.
129. ———. Structure of the northern part of the Bristow Quadrangle, Creek County, Okla., with reference to petroleum and natural gas. *U. S. Geol. Survey Bull.* 661-B, 1917. 31 pp. A study of the geology of the region, with conclusions as to prospective oil and gas areas. Points out actual localities which show favorable structure.
130. HAGER, DORSEY. The evidence of the Oklahoma oil fields on the anticlinal theory. *Bull. Am. Inst. Min. Eng.*, February, 1917, pp. 195-198; discussion, April, 1917, pp. 626-635. *Transactions*, vol. 56, 1917, pp. 843-846; discussion, pp. 846-855. In application of the anticlinal theory and the value of geology in the Oklahoma and Kansas oil fields, a list is given of the productive fields or pools in these States, with types of fold domes, anticlines, or terraces, and the manner in which they were found, whether by geologic study or by wildcatting. Concludes that the theory holds and that the geologist is playing an important part in the development of the fields.
131. HEALD, K. C. The oil and gas geology of the Foraker quadrangle, Osage County, Okla. *U. S. Geol. Survey Bull.* 641, 1917, pp. 17-47. Published also as separate *Bull.* 641-B, 1916. Discusses the character of the surface of the region, the accessibility of different parts of the quadrangle, its stratigraphy and structure. Sets forth the probability of the occurrence of oil and gas, and makes specific recommendations for prospecting.
132. JILLSON, W. R. Preliminary note on the occurrence of vertebrate footprints in the Pennsylvanian of Oklahoma. *Am. Jour. Sci.*, vol. 44, July, 1917, pp. 56-58. Describes fossil footprints found in a sandstone member of the Middle or Lower Pennsylvanian in the Osage Nation, near Pawhuska, in a horizon correlated with the upper part of the Le Roy shales of Kansas.
133. MATHER, K. F. Pottsville formations and faunas of Arkansas and Oklahoma. *Am. Jour. Sci.*, vol. 43, February, 1917, pp. 133-139.
134. OIL AND GAS JOURNAL. Prospective oil areas, Pontotoc County, Okla. Vol. 16, Aug. 9, 1917, p. 34. Gives brief description of these areas and suggestions as to test drilling.
135. POWERS, SIDNEY. Age of the oil in southern Oklahoma fields. *Bull. Am. Inst. Min. Eng.*, November, 1917, pp. 1971-1982; discussion, March, 1918, pp. 708-709; April, 1918, p. 842. From a detailed geological study it is concluded that the southern Oklahoma fields except Fox and Healdton, yield petroleum from Permian strata, whence it migrated from Pennsylvanian or older sands; that the Fox, Healdton, and Graham fields produce oil from the Pennsylvanian sands; and that at Healdton the anticlinal structure is buried beneath sediments of both Permian and Pennsylvanian, which are conformable but deposited on an upturned mass of Ordovician strata from which no oil is, or will be, produced.

136. POWERS, SIDNEY. The Healdton oil field, Oklahoma. *Econ. Geol.*, vol. 12, October-November, 1917, pp. 594-606. Gives general geologic structure, detailed Healdton structure, and character of the oil with gravity determinations. Discusses probable future development.
137. ———. Ordovician strata beneath the Healdton oil field, Oklahoma. Paper read before the Geological Society of America. Abstract, *Bull. Geol. Soc. Am.*, vol. 28, March, 1917, p. 159. States that the oil of Healdton field occurs largely in Permian sands, but may have been derived from underlying Pennsylvanian or older beds; that fossils from Carter County have been identified as of Ordovician age, and that pronounced unconformities must exist beneath several of the southern Oklahoma oil fields in order to account for pre-Permian rocks at Healdton and Loco, and for variations in the well logs.
138. SHANNON, C. W., AND OTHERS. Petroleum and natural gas in Oklahoma. Part 2. A discussion of the oil and gas fields and undeveloped areas of the State, by counties. *Oklahoma Geol. Survey Bull.* 19, part 2, 1917. 536 pp. Part 1 published in 1915. Covers past and present development and possibilities of future development of each oil field.
139. SNIDER, L. C. Geography of Oklahoma. *Oklahoma Geol. Survey Bull.* 27, 1917. 325 pp. Contains chapters on the general geology of the State, detailed geology and geologic history of Oklahoma and its mineral resources, with brief discussions of these subjects for each county.

See also No. 104.

DEVELOPMENT AND PRODUCTION.

140. BURTON, G. E. Methods of exploring for oil and gas. *Oklahoma Geol. Survey Circular* 8, July, 1917. 20 pp. Discusses the following methods: (1) Securing a block of leases and making churn drill tests; (2) geological examination of the surface in search of favorable structures and drilling of churn drill holes; (3) the use of the diamond drill. Explains the structural contour method and the dip and strike method of showing the attitude of a stratum from drill hole data. Gives data on the cost of drilling oil and gas wells. (*See also* *Eng. and Min. Jour.*, vol. 104, Sept. 8, 1917, p. 446.)
141. NOLAND, E. T. Fire and explosive hazards in the Oklahoma oil fields. *Manufac. Rec.*, vol. 72, July 19, 1917, p. 70d. General considerations as to dangers from fire in drilling for and in storing and handling oil.

See also Nos. 89, 108, 406, 505.

TRANSPORTATION, STORAGE, AND DISTRIBUTION.

142. PETERSON, F. P. Proper handling of pipe lines the secret of casing-head yield. *Nat. Petroleum News*, vol. 9, August, 1917, pp. 46, 48. Discusses the necessity for care in pipe line provision for gathering the gas, particularly in Oklahoma. Enumerates points of special importance in their construction and operation.

See also No. 141.

PROPERTIES AND THEIR DETERMINATION, *see* Nos. 104, 136.

REFINING AND REFINERIES.

143. MCINTYRE, JAMES. Oklahoma produces 350,000 gallons. *Oil and Gas Jour.*, vol. 16, Aug. 16, 1917, pp. 29-31, 33. Review of the casing-head gasoline industry in Oklahoma, giving, in addition to production figures, the yield of gasoline from the oils of various pools in the State, the estimated cost of plants, and a list of plants in operation in the State, with their daily capacity.

See also Nos. 89, 142.

STATISTICS, *see* Nos. 14-18, 20-38, 143, 405.

MAPS.

144. BURKE, M. P. Burke's township plats of the oil fields in north-central Oklahoma. Tulsa, Okla.: Tulsa Indian Trading Co., 1917. 395 pp. of plans. Folding map. \$25.

LEGAL REGULATIONS.

145. CORPORATION COMMISSION OF OKLAHOMA. Rules, regulations, and requirements governing the conservation of natural gas and crude oil, or petroleum, in the State of Oklahoma. Cause No. 2935. Order No. 1299. Prescribes 41 rules, effective August 20, 1917, intended to prevent waste in the drilling of oil and gas wells in the State.
146. OIL AND GAS JOURNAL. Regulations on casing-head gasoline. Vol. 16. Aug. 23, 1917, p. 30. Gives text of rules adopted by the Department of the Interior to govern the utilization of casing-head gas produced from oil wells on restricted Indian land, not including the Osage Nation. Includes a table of royalties to be paid by the lessee to the Indian lessor.

TEXAS, EASTERN, CENTRAL, AND NORTHERN.

GEOLOGY AND ORIGIN.

147. BAKER, C. L., and BOWMAN, W. F. Geologic exploration of the south-eastern front range of Trans-Pecos Texas. Bull. Univ. Texas, No. 1753. Sept. 20, 1917, pp. 61-177.
148. BÖSE, EMIL. Geological conditions near Bridgeport and Chico, Wise County, Tex., with special reference to the occurrence of oil. Bull. Univ. Texas, No. 1758, Oct. 15, 1917. 31 pp. Gives geology of the region, and discusses the possibilities of finding oil.
149. DRAKE, N. F. Report on the Colorado coal field of Texas. Bull. Univ. Texas, No. 1755, Oct. 1, 1917. 75 pp. Includes, beside a detailed geologic description of the region, an account of its economic geology, including oil and gas occurrence.
150. MATSON, G. C., and HOPKINS, O. B. The Corsicana oil and gas field, Texas. U. S. Geol. Survey Bull. 661-F. 1917. 42 pp. Detailed results of an investigation of the history, production, and geology of this field, especially in regard to types of structure and the age and relations of the different sands. Analyses of the oil and gas and statistics of production are given.
151. PHILLIPS, W. B. The sulphur deposits in Culberson County, Tex. Bull. Am. Inst. Min. Eng., September, 1917, pp. 1449-1466; discussion, January, 1918, pp. 70-71. Includes a log of a well drilled by the Texas Petroleum Co. which showed no deposits of sulphur, but small quantities of oil and gas. In a summary of the fuel resources of the region, mentions shallow wells which produce lubricating oil of good quality.
152. UDDEN, J. A. Notes on the geology of the Glass Mountains. Bull. Univ. Texas, No. 1753, Sept. 20, 1917, pp. 3-59. Describes occurrences of oil in this region, and discusses the possibility of the existence of oil-bearing formations.
153. WRATHER, W. E. Notes on the Texas Permian. Bull. Southwestern Assoc. Petroleum Geologists, vol. 1, 1917, pp. 93-106. A study of geologic sections in Texas, and a comparison with the records of the boring at Spur. (See Udden, J. A. The deep boring at Spur. Bull. Univ. Texas, October, 1914.) Includes also notes on the stratigraphy of the Permian of the Pecos Valley in southeastern New Mexico.

See also No. 104.

PROPERTIES AND THEIR DETERMINATION.

154. SCOTT, A. C. The fuels of Texas. Coal Age, vol. 11, Apr. 14, 1917, pp. 658-661. A review of the coal, wood, lignite, oil, and gas resources of the State. Gives general location of the oil and gas fields, analyses of fuel oils, and calorific value of oil and gas, with discussion of their economic value as fuels.

See also Nos. 104, 150.

UTILIZATION, see No. 154.

STATISTICS.

PRODUCTION.

155. Oil Trade Journal. Texas and Louisiana output. Monthly statement. January-December, 1917.

See also Nos. 14-18, 20-38, 150.

LEGAL REGULATIONS.

156. OIL AND GAS JOURNAL. Amendment of Texas land enactments. Vol. 15, Mar. 15, 1917, pp. 30-31. Discusses good and bad points of House bill 676, which amends laws relating to the matter of obtaining public lands for the development of mineral industries.

MISSOURI.

STATISTICS.

- 156a. MISSOURI BUREAU OF GEOLOGY AND MINES. Biennial report of the State Geologist, 1917. Rolla, 1917. 75 pp. Gives production of petroleum and natural gas.

GULF COAST FIELD.

DEVELOPMENT AND PRODUCTION.

157. OIL TRADE JOURNAL. Cost of producing oil in the Coastal fields. Vol. 8, December, 1917, p. 80. States that the consensus of opinion of representative companies in this region places the cost per barrel at not less than \$1, and in some cases at \$1.50.

STATISTICS, see Nos. 14-18, 20-38.

LOUISIANA, COASTAL.

GEOLOGY AND ORIGIN.

158. KENNEDY, W. B. Coastal salt domes. Bull. Southwestern Assoc. Petroleum Geologists, vol. 1, 1917, pp. 34-59. Study of the geology of the coastal region as shown by well records and fossils. Describes gas mounds, and discusses their origin. Describes structure of larger domes of various types, and discusses their age and origin.
159. LUCAS, A. F. A review of the exploration at Belle Isle, La. Bull. Am. Inst. Min. Eng., September, 1917, pp. 1435-1447; discussion, January, 1918, pp. 88-92. Trans., vol. 57, 1918, pp. 1034-1046; discussion, pp. 1046-1049. Gives account of early and recent work of drilling wells to ascertain the extent of the salt and sulphur deposits of this island, and sums up the geology of the locality. Gives well logs showing oil, gas, salt, and sulphur.

160. SHAW, E. W. Possibility of using gravity anomalies in the search for salt-dome oil and gas pools. *Science*, vol. 46, Dec. 7, 1917, pp. 553-556. Suggests that concealed salt domes of the Louisiana and Texas coastal plain perhaps may be located by determinations of gravity anomalies. Great pools of oil are associated with some of the salt domes, and this method offers a means of prospecting.

See also Nos. 120, 317.

DEVELOPMENT AND PRODUCTION.

161. NATURAL GAS AND GASOLINE JOURNAL. Great southwestern well. Vol. 11, June, 1917, pp. 158-159. Describes the closing-in of a wild gas well near Houma, La.
162. RICKARD, T. A. Anthony F. Lucas and the Beaumont gusher. *Min. and Sci. Press*, vol. 115, Dec. 22, 1917, pp. 887-894. *West. Eng.*, vol. 9, January, 1918, pp. 13-20. An interview with Capt. Lucas which gives details of oil discovery and development in Texas and Louisiana. Includes description of special methods used in drilling and controlling the Spindle Top gusher.

TRANSPORTATION, *see* No. 545.

STATISTICS.

FIELD DEVELOPMENT AND PRODUCTION.

163. OIL TRADE JOURNAL. Monthly statement of Gulf coast drilling operations, and of Texas and Louisiana output.

See also Nos. 14-18, 20-38.

TEXAS, COASTAL AND SOUTHERN.

GEOLOGY AND ORIGIN.

164. DEUSSEN, ALEXANDER. The Humble (Tex.) oil field. *Bull. Southwestern Assoc. Petroleum Geologists*, vol. 1, 1917, pp. 60-79; discussion, pp. 79-84. Gives history of the field, its geology, typical well logs, an analysis of the oil, drilling methods used, and cost of wells.
165. HOPKINS, O. B. The Palestine salt dome, Anderson County, Tex. The Brenham salt dome, Washington and Austin Counties, Tex. *U. S. Geol. Survey Bull.* 661-G, 1917. 22 pp. States that the absence of oil and gas as surface seepages and in shallow wells in the Palestine dome detracts from the oil prospects of the locality; and that drilling for oil in the Brenham dome has been discouraged. Suggestions are made, however, for further drilling.
166. PHILLIPS, W. B. The so-called salt domes or mounds of Texas. *Manufac. Rec.*, vol. 71, May 24, 1917, p. 62. Gives location of known salt domes in the Gulf Coastal Plain and data concerning them.

See also Nos. 158, 160, 284, 317.

DEVELOPMENT AND PRODUCTION, *see* Nos. 162, 164; PROPERTIES AND DETERMINATION, *see* Nos. 154, 164; UTILIZATION, *see* No. 154.

STATISTICS.

FIELD DEVELOPMENT AND PRODUCTION.

167. OIL TRADE JOURNAL. Monthly statement of Gulf coast drilling operations and Texas and Louisiana output.

See also Nos. 14-18, 20-38.

ROCKY MOUNTAIN FIELD.

GEOLOGY AND ORIGIN.

168. TOMLINSON, C. W. The middle Paleozoic stratigraphy of the central Rocky Mountain region. *Jour. Geol.*, vol. 25, 1917, pp. 112-134, 244-257, 373-394. STATISTICS, *see* Nos. 14-18, 20-38.

COLORADO.

GEOLOGY AND ORIGIN.

169. GEORGE, R. D. Petroleum geology of Colorado. *Mining American*, vol. 75, July 21, 1917, pp. 11-13. Gives location of the anticlines and domes in the State, and discusses oil possibilities.
170. ——— Undeveloped oil regions in Colorado. *Oil and Gas Jour.*, vol. 15, Apr. 26, 1917, pp. 34. Discusses the probabilities of finding undeveloped oil fields in this State. Describes definite conditions necessary for the accumulation of oil, and after applying these tests to Colorado, concludes that there exist the right kinds of rock formations, oil seeps, and asphalt deposits. Mentions three known oil fields already profitable.
171. LEE, W. T. Relations of the Morrison and Sundance formations. *Jour. Wash. Acad. Sci.*, vol. 7, July 19, 1917, pp. 431-432. (Abstract.)
172. WINCHESTER, D. E. Oil shale in northwestern Colorado and adjacent areas. *U. S. Geol. Survey Bull.* 641, 1917, pp. 139-198. Published also as separate Bull. 641-F, 1916. *Jour. Wash. Acad. Sci.* vol. 7, May 4, 1917, p. 265 (Abstract). With a view to showing the quantity and quality of the oil that may be distilled from the richer shale beds of this region, a study was made of its geology, and tests made of the shale found. Numerous stratigraphic sections are given to show the character of the rocks exposed. Detailed description is given of the tests made, and the apparatus used and results tabulated to show the yields of the different products.

See also No. 6.

REFINING AND REFINERIES.

173. ALLEN M. A. The supply of gasoline. *West. Eng.*, vol. 8, November, 1917, pp. 436-437. Considers the possible source of gasoline in the natural bitumens, such as albertite and Uintaite, as found in Utah, Oklahoma, and Colorado; in Kentucky cannel coal; and in the shales of Utah and Colorado.

STATISTICS.

STATISTICS, *see* Nos. 14-18, 20-38.

MONTANA.

GEOLOGY AND ORIGIN.

174. CALVERT, W. R. Geology of the Upper Stillwater Basin, Stillwater, and Carbon Counties, Mont., with special reference to coal and oil. *U. S. Geol. Survey Bull.* 641, 1917, pp. 199-214. Published also as separate Bull. 641-G, 1916. Geologic study of the region and brief statement as to the prospects of finding oil. Tells of unsuccessful attempt to obtain oil by drilling.

175. COLLIER, A. J. The Bowdoin Dome, Mont., a possible reservoir of oil or gas. U. S. Geol. Survey Bull. 661-E, 1917. 17 pp. A study of the stratigraphy and structure of the dome, with conclusion that a test for oil would be sufficiently warranted by the structure, the positions of possible sources of oil, and the actual discovery of a small flow of gas.
176. HARES, C. J. The southern extension of the Eagle sandstone and its relation to the Niobrara shale in Wyoming. Jour. Wash. Acad. Sci., vol. 7, July 19, 1917, pp. 429-431 (Abstract).
177. STEININGER, EUGENE. Anticlines in the Blackfeet Indian Reservation, Mont. U. S. Geol. Survey Bull. 641, 1917, pp. 281-305. Published also as separate Bull. 641-J, 1917. Jour. Wash. Acad. Sci., vol. 7, May 4, 1917, pp. 264-265 (Abstract). A study of the general geologic formation of the reservation, and a detailed description of the formations that appear to contain oil or gas in southern Alberta and northern Montana, with a view to further search for oil and gas in this region.
178. ——— Possibilities of oil and gas in north-central Montana. U. S. Geol. Survey Bull. 641, 1917, pp. 49-91. Published also as separate Bull. 641-C, 1916. Jour. Wash. Acad. Sci., vol. 7, Feb. 4, 1917, p. 77 (Abstract). Reviews the geologic structure and formation similar to that of other near-by fields.
179. ——— Stratigraphy of the Two Medicine formation (Montana). U. S. Geol. Survey Prof. Paper 103, 1917, pp. 1-3.

UTAH.

HISTORY AND GEOGRAPHIC OCCURRENCE, *see* No. 181.

GEOLOGY AND ORIGIN.

180. CHILD, W. H. Utah as an oil-producing State. Mining American, vol. 75, Dec. 22, 1917, pp. 7-8. Describes occurrences, and discusses prospects in Utah.
181. ROBINSON, H. M. Ozokerite in central Utah. U. S. Geol. Survey Bull. 641, 1917, pp. 1-16. Published also as separate Bull. 641-A, 1916. Gives location of the field, its history, and geology; composition and properties of the material, tests applied to it, and its mode of occurrence and origin. Comparisons are made with the Galician product. Mines now in operation are described, and future prospects of the field discussed.

See also No. 6.

PROPERTIES AND THEIR DETERMINATION, *see* Nos. 181, 763; REFINING AND REFINERIES, *see* Nos. 173, 181; UTILIZATION, *see* No. 181; STATISTICS, *see* Nos. 14-18, 20-38.

WYOMING.

GEOLOGY AND ORIGIN.

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See No. 245.

CANADA (112).

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See also No. 408.

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MEXICO (113).

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279. CRUZ, S. C. Estudio del campamento de Ixhuatlán. (Study of the field of Ixhuatlán.) Bol. del Petróleo, vol. 3, February, 1917, pp. 125-134. General description of the field, its location, general characteristics; detailed descriptions of wells drilled, production statistics of each well for the year 1914; discusses transportation and storage facilities.
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- See also Nos. 1, 43, 44.

GEOLOGY AND ORIGIN.

281. DICKERSON, R. E., and KEW, W. S. W. The fauna of a medial Tertiary formation and the associated horizons of northeastern Mexico. Proc. California Acad. Sci., 4th series, vol. 7, No. 5, July 30, 1917, pp. 125-156. Identification and description of Tertiary fossils from the Gulf coast of Mexico near Tampico and Tuxpan. Quotes description of the geology of the region from "Tertiary Deposits of Northeastern Mexico," by E. T. Dumble, Proc. Cal. Acad. Sci., 4th series, vol. 5, No. 6, 1915, pp. 163-193.
282. FLORES, TEODORO. El petróleo Mexicano. (Mexican petroleum.) Bol. del Petróleo, vol. 3, January, 1917, pp. 4-23. Discusses the industry in Mexico, the geology of the oil regions, and the origin of the oil.
283. GARFÍAS, V. R., and HAWLEY, H. J. Funnel and anticlinal-ring structure associated with igneous intrusions in the Mexican oil fields. Bull. Am. Inst. Min. Eng., August, 1917, pp. 1147-1159; discussion, January, 1918, pp. 92-97. Trans., vol. 57, 1918, pp. 1071-1083; discussion, pp. 1083-1088. A general discussion of the various viewpoints of other observers in regard to the igneous intrusions and their relation to the accumulation of oil, and a presentation of additional data on the subject. Bibliography is appended. (See also Petroleum Age, vol. 4, October, 1917, pp. 35-39.)
284. HARTLEY, BURTON. The petroleum geology of the Isthmus of Tehuantepec. Econ. Geol., vol. 12, October-November, 1917, pp. 581-588. Describes Isthmus salt domes from which petroleum is obtained, and points out similarities between these domes and those of the United States (Texas) and Europe.
- See also Nos. 280, 391, 1480.

DEVELOPMENT AND PRODUCTION.

285. HAZLETT, A. J. Drilling a well in Mexico is a costly operation. *Oil Trade Jour.*, vol. 8, May, 1917, p. 70. Gives cost of drilling equipment and labor.
TRANSPORTATION, *see* No. 277.

PROPERTIES AND THEIR DETERMINATION.

286. BOLETIN DEL PETROLEO. Analisis de petróleo crudo procedente de distintas regiones mexicana. (Analyses of crude petroleum from different parts of Mexico.) Vol. 4, October, 1917, pp. 320-323.
286a. DE IBARROLA, A. M. Analisis de una nafta (Analysis of naphtha). *An. Instit. Geol. de Méx.*, No. 4, 1917, pp. 23-30.
287. MORALES, S. S. Análisis de un petróleo crudo. (Analysis of a crude petroleum.) *Bol. del Petróleo*, vol. 4, November, 1917, pp. 429-434. Gives detailed study of a sample of oil from Tuxpan. The analysis is among the first made in the new laboratory of the Geologic Institute of Mexico. *See also* *An. Instit. Geol. Méx.*, No. 4, 1917, pp. 1-19.
See also Nos. 277, 280.
REFINING AND REFINERIES, *see* No. 277; UTILIZATION, *see* Nos. 277, 280.

STATISTICS.

EXPORTS.

288. OIL TRADE JOURNAL. Monthly statement of shipments of oil from Tampico and Tuxpan into the United States, by points of destination. January-December, 1917.

IMPORTS.

289. UNITED STATES GEOLOGICAL SURVEY. Mineral Resources of the United States, part 2, Nonmetals. Annual statement of petroleum and petroleum products imported into Mexico from the United States.

PRODUCTION OF PETROLEUM, NATURAL GAS, AND ASPHALT.

290. UNITED STATES GEOLOGICAL SURVEY. Mineral Resources of the United States, part 2, Nonmetals. Gives annual production statistics.
See also No. 277.

LEGAL REGULATIONS.

291. BOLETIN DEL PETRÓLEO. Proyecto de ley del petróleo en los Estados Unidos Mexicanos y sus fundamentos, estudiados en el Departamento de Petróleo. Vol. 4, December, 1917, pp. 538-570. Gives the provisions of the Mexican petroleum law, and explains its principles.
292. MINING AND OIL BULLETIN. The new constitution of Mexico. Vol. 3, April, 1917, pp. 123-124, 127. Gives extracts from the constitution interesting to mining and oil operators.
293. PETROLEUM. Scale of taxes on Mexican oil is made public. Vol. 4, November, 1917, p. 133. Partial translation of the statement of the tax, and the reasons for its basis and assessment.
294. PETROLEUM REVIEW. A blow to the Mexican petroleum industry. Vol. 36, May 19, 1917, pp. 349-350. A criticism of the new policy of taxation of petroleum and its products in Mexico. (*See also* No. 295 for refutation.)

295. SANTAELLA, JOAQUÍN. Refutacion al articulo de "The Petroleum Review," de fecha 19 de Mayo de 1917 (in regard to the new oil taxation decree). Bol. de Petroleo, vol. 4, September, 1917, pp. 215-225. Refutation of an editorial in Petroleum Rev., vol. 36, May 19, 1917, pp. 349-350, which attempts to show that the new policy is shortsighted and will prove disastrous to the Mexican oil industry. The English article is translated in full, and each point of criticism defended.

See No. 294.

ECONOMICS.

- 295a MARVIN, GEORGE. The jeopardy of Tampico. World's Work, vol. 34, Aug., 1917, pp. 374-387. Discusses strategic and economic importance of the Mexican oil fields in the World War.

CENTRAL AMERICA (113).

OCCURRENCE, *see* Nos. 1, 43, 44.

STATISTICS.

296. UNITED STATES GEOLOGICAL SURVEY. Mineral Resources of the United States, part 2, Nonmetals. Gives annual production statistics for petroleum, natural gas, and asphalt.

WEST INDIES (114).

OCCURRENCE, *see* Nos. 1, 43, 44.

STATISTICS.

297. UNITED STATES GEOLOGICAL SURVEY. Mineral Resources of the United States, part 2, Nonmetals. Annual production of petroleum and asphalt in the West Indies.

BARBADOS.

STATISTICS, *see* No. 297.

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CUBA.

HISTORICAL REFERENCES AND GEOGRAPHIC OCCURRENCE.

299. ENGINEERING AND MINING JOURNAL. First producing oil well in Cuba. Vol. 104, July 28, 1917, p. 168. Brief account of the discovery of oil in commercial quantities in Cuba, and review of the conditions.
300. GILLESPIE, F. K. The real facts as to the Cuban petroleum situation. What has been done, what is being done, and what may be expected in island developments. Oil, Paint, and Drug Rep., vol. 92, July 2, 1917, p. 61; July 9, p. 50F; July 16, p. 50F; July 23, pp. 56, 59; July 30, pp. 56, 59. Detailed account of operations.
301. KNIGHT, J. V. The oil industry on the island of Cuba. Evening Post Oil Industry Supplement, New York, Aug. 31, 1917, pp. 40, 42. Short account of the occurrence of oil on the island, and brief description of each of the 25 "developments" in progress.
302. OIL AND GAS JOURNAL. Recent developments in isle of Cuba. Vol. 16, June 21, 1917, p. 30. Tells of general conditions in Havana Province, and reviews briefly development there since September, 1916.

GEOLOGY.

303. HAYES, C. W., VAUGHAN, T. W., and SPENCER, A. C. Informe sobre un reconocimiento geológico de Cuba. Translated, with annotations, by Pablo Ortega y Ros, from "Report on a geological reconnaissance of Cuba," Washington, 1901. Boletín de minas. Dirección de Montes y Minas, Cuba, January, 1917, pp. 3-63; July, 1917, pp. 63-162.

STATISTICS, *see* No. 297.

TRINIDAD.

HISTORICAL REFERENCES AND GEOGRAPHIC OCCURRENCE.

304. SCIENTIFIC AMERICAN SUPPLEMENT. Asphalt. Where it comes from and some of its characteristics. Vol. 84, Sept. 1, 1917, pp. 136-137. Describes Trinidad Pitch Lake and the properties of the asphalt found there.

See also No. 327.

PROPERTIES AND THEIR DETERMINATION, *see* Nos. 304, 691; STATISTICS, *see* No. 297.

OTHER ISLANDS.

PORTO RICO.

STATISTICS.

305. UNITED STATES BUREAU OF FOREIGN AND DOMESTIC COMMERCE. Monthly summary of foreign commerce of the United States. Gives quantity and value of crude and refined mineral oil shipped to Porto Rico.

SOUTH AMERICA (120).

HISTORICAL REFERENCES AND GEOGRAPHIC OCCURRENCE.

- 306.** CLAPP, F. G. Review of present knowledge regarding the petroleum resources of South America. Bull. Am. Inst. Min. Eng., October, 1917, pp. 1739-1791; discussion, January, 1918, pp. 101-102. Trans., vol. 57, 1918, pp. 914-966; discussion, pp. 966-967. Discusses geographic distribution of petroleum in South America, geologic conditions, and the quality of the oil. Gives data on the distribution, geological conditions, quality, and production (statistics) in Peru, Argentina, Venezuela, Colombia, Ecuador, Brazil, Chile, Bolivia, the Guianas, and the Falkland Islands.

See also Nos. 1, 43, 44.

GEOLOGY AND ORIGIN, *see* No. 306; PROPERTIES AND THEIR DETERMINATION, *see* No. 306.

STATISTICS.

- 307.** UNITED STATES GEOLOGICAL SURVEY. Mineral Resources of the United States, part 2. Nonmetals, pp. 679-886. Annual production figures for the principal producing countries.

See also No. 306.

ARGENTINA (121).

HISTORICAL REFERENCES AND GEOGRAPHIC OCCURRENCE.

- 308.** CHATFIELD, LYMAN. Concerning oil fields of Argentina. Oil and Gas Jour., vol. 15, Mar. 1, 1917, p. 26. General conditions in the Argentine fields, and reasons for the failure of the Government in its development of the deposits in the Comodoro Rivadavia field. Description of the slight and scattered attempts made by natives and ranchmen to develop the rich oil fields of the Salta district, and discussion of opportunities for private capital in Argentine Republic.
- 309.** HERMITTE, E. M. Área de distribución de los yacimientos petrolíferos y estado actual de su explotación en la Argentina. (The location of the petroleum fields, and the status of their exploitation in Argentine.) Proc. Second Pan American Scientific Congress, 1915-16 (Washington, 1917), vol. 8. Mining, Metallurgy, Economic Geology, and Applied Chemistry, pp. 114-129. Describes occurrence and development in four districts of Argentine, gives production figures, and analyses of the oils. Contains short bibliography.
- 310.** OIL AND GAS JOURNAL. Great future for Argentine oil fields. Vol. 16, July 5, 1917, p. 34. A translation of a review of the Argentine industry appearing in "La Nación," of Buenos Aires, for Apr. 14, 1917, which describes the location of the fields, the quality of the oil, and possibilities of production by thorough exploitation. Also Petroleum Age, vol. 4, August, 1917, pp. 33-34.

See also Nos. 43, 44, 306.

GEOLOGY AND ORIGIN.

311. LONGOBARDI, E. Petroleum of Tres Puentes, Punta Arenas. *Anales soc. quim. Argentina*, vol. 5, 1917, p. 60-61. *Chem. Abs.*, vol. 12, Jan. 10, 1918, p. 93 (Abstract). Gives mode of occurrence and properties of oil.

See also No. 306.

PROPERTIES AND THEIR DETERMINATION, *see* Nos. 306, 309, 311; STATISTICS, *see* Nos. 306, 307, 309.

PERU (122).

OCCURRENCE, *see* Nos. 43, 44, 306; GEOLOGY AND ORIGIN, *see* Nos. 306, 314; PROPERTIES AND THEIR DETERMINATION, *see* No. 306.

STATISTICS.

FIELD DEVELOPMENT AND PRODUCTION.

312. PERT. Cuerpo de Ingenieros de Minas. Boletins. Contain statistics of oil production, drilling, etc.

See also Nos. 306, 307.

OTHER COUNTRIES (129).

ECUADOR.

HISTORICAL REFERENCES AND GEOGRAPHIC OCCURRENCE.

313. ANDRADE, C. D. Outline of the petroleum resources of Ecuador. *Proc. Second Pan American Scientific Congress, 1915-16* (Washington, 1917), vol. 3, Conservation of Natural Resources, pp. 203-205; discussion, pp. 205-206. Gives location of the oil fields, geology of the Santa Elena Peninsula, history of development, analysis of the oil, and a review of the advantages of the field as an oil-producing center.

314. MADDOCK, CHARLES. The oil lands of Santa Elena, Ecuador. *Petroleum Rev.*, vol. 36, Feb. 17, 1917, p. 125. Short description of the field, the characteristics of the oil produced, and a comparison of the geology of this field with that of Peruvian productive areas.

See also Nos. 43, 44, 306.

GEOLOGY AND ORIGIN, *see* Nos. 306, 313, 314; DEVELOPMENT AND PRODUCTION, *see* No. 313; PROPERTIES AND THEIR DETERMINATION, *see* Nos. 306, 313, 314.

COLOMBIA.

GEOLOGY AND ORIGIN.

315. WHITE, K. D. Oil development in Colombia, South America. *Bull. Southwestern Assoc. Petroleum Geologists*, vol. 1, 1917, pp. 156-159. Gives history of attempted developments, and describes possible petroleum lands.

See also No. 306.

VENEZUELA.

STATISTICS.

316. UNITED STATES GEOLOGICAL SURVEY. Mineral Resources of the United States, 1916, part 2. Nonmetals. Gives annual exports of asphalt from Venezuela.

See also No. 306.

EUROPE (130).

GEOLOGY AND ORIGIN.

317. VAN DER GRACHT, W. The saline domes of northwestern Europe. *Bull. Southwestern Assoc. Petroleum Geologists*, vol. 1, 1917, pp. 85-92. Describes these formations, and discusses their probable causes and relation to oil and gas accumulation, with a view to explaining the formation of similar domes in other parts of the world, such as the Gulf Coastal Plain of the United States. Includes a brief description of the oil-producing domes of Roumania.

See also No. 284.

STATISTICS.

PRODUCTION.

318. UNITED STATES GEOLOGICAL SURVEY. Mineral Resources of the United States, part 2, Nonmetals. Annual statistics for principal producing countries.

AUSTRIA-HUNGARY (131).

OCCURRENCE (*see* Nos. 43, 44).

DEVELOPMENT AND PRODUCTION.

319. MILLAR, A. Some notes on natural gas and its utilization. *Petroleum World*, vol. 14, April, 1917, pp. 161-167. Discusses the collection and use of natural gas, particularly in the Galician oil fields, where it is used as fuel.
320. PETROLEUM WORLD. The petroleum industry in Austria-Hungary. Vol. 14, December, 1917, pp. 530-531. Résumé of an article by Van H. de Wit in a Dutch trade report. Explains royalty methods in use, and the participation of foreign capital in the Galician oil industry.

PROPERTIES AND THEIR DETERMINATION. *see* No. 181; UTILIZATION, *see* No. 319; STATISTICS, *see* No. 318.

GERMANY (133).

GEOLOGY AND ORIGIN, *see* No. 317.

TRANSPORTATION.

321. HENRY J. D. The Germans in oil. Why and where they have failed. *Petroleum*, vol. 3, August, 1917, pp. 87-88, 90. Reviews Germany's achievements in the oil industry, particularly her interest in the marine transport of oil.

REFINING AND REFINERIES.

322. STEUART, D. R. The brown coal distillation industry of Germany. *Jour. Soc. Chem. Ind.*, vol. 36, Feb. 28, 1917, pp. 167-176. Detailed description of the industry as carried on in Saxony and Messel. Makes comparisons with the Scotch oil-shale industry.

STATISTICS, *see* Nos. 318, 321.

GREAT BRITAIN (134).

HISTORICAL REFERENCES AND GEOGRAPHIC OCCURRENCE.

323. BEVAN, T. H. Scotland's oil shale industry. *Mining American*, vol. 75, Dec. 22, 1917, p. 9. General review of the industry. From Commerce Report.
324. ENGINEER. The mineral oil resources of the British Empire. Vol. 124, Nov. 9, 1917, p. 412. Abstract of paper by J. S. S. Brame read before the London School of Economics. Gives statistics of the proportion of the world's output credited to the British Empire. Reviews sources of oil and discusses future prospects, particularly the possibilities of the Kimmeridge shales of England.
325. ——— The Scottish shale-oil industry. Vol. 123, Mar. 9, 1917, pp. 221-222; Mar. 23, pp. 274-275. First part gives a general review of the industry, and the second part detailed descriptions of methods of distillation, the products obtained, and their uses.
326. FORBES-LESLIE, WILLIAM. The occurrence of petroleum in England. *Jour. Inst. Petroleum Technologists*, vol. 3, February, 1917, pp. 152-183; discussion, pp. 183-190. *Petroleum Rev.*, vol. 36, Jan. 20, 1917, pp. 45-46; Jan. 27, pp. 67-68; Feb. 3, pp. 95-96; Feb. 10, pp. 115-116; Feb. 17, pp. 137-139; Feb. 24, pp. 157-159; Mar. 3, pp. 173-174. Reviews the history of the discovery and partial development of commercially valuable oil in Great Britain, and gives locations of "oil escapes" in the middle, western, and eastern zones. Discusses the prospects of detecting further deposits through a study of those already known. Goes into a detailed study of the tectonic lines of Great Britain, and their relation to surface indications of petroleum.
327. HENRY, J. D. The British Empire and the greater oil world. *Petroleum*, vol. 2, March, 1917, pp. 81-84; April, pp. 82-84; vol. 3, May, 1917, pp. 87-88, 90; June, pp. 87-89; July, pp. 88, 90-92, 95-96. Series of articles dealing historically and descriptively with the oil fields of the Empire. Part 1 discusses the probable exhaustion of the world's supply of oil. Part 2 describes the Trinidad oil fields. Part 3 gives the early history of asphalt, and a description of the pitch lake in Trinidad. Part 4 gives the history of the industry in Newfoundland, and part 5 gives an account of what has been done there in recent years, with a short geological description of the field.

See also Nos. 43, 44.

GEOLOGY AND ORIGIN.

328. CONACHER, H. R. J. Oil shales and torbanites. *Geol. Mag.*, decade 6, vol. 4, No. 2, February, 1917, pp. 93-94. Abstract of paper in *Trans. Geol. Soc. Glasgow*, vol. 16, part 2, pp. 164-192. Gives results of a microscopic study of the shales and torbanites of the Lothians to ascertain the substances which yield, on distillation, olefins, paraffins, and naphthenes in large proportions, while coal under similar treatment yields only tar containing small proportions of these compounds. Concludes that oil shales and torbanites are derived from the same substances as coal—vegetable matter—but that in the shales there has been a much more complete elimination of the woody matter, leaving the resins, cellulose, and mud.

329. DALTON, W. H. The oil prospects of the British Isles. *Jour. Inst. Petroleum Technologists*, vol. 4, December, 1917, pp. 37-50; discussion, pp. 51-62. *Petroleum Rev.*, vol. 37, Nov. 24, 1917, pp. 325-326; Dec. 1, pp. 347-348. *Petroleum World*, vol. 14, December, 1917, pp. 521-525. Describes known occurrences in geologic sequence; concludes that prospects are not good for commercial quantities of oil, and drilling alone can decide the question definitely.
330. FERGUSON, DAVID. The form and structure of the coal fields of Scotland. *Trans. Inst. Min. Eng.*, vol. 52, 1916-17, pp. 355-391; discussion, vol. 53, 1916-17, pp. 116-119, 167-181, 258-261. Includes discussion of the relation of oil shales to coal seams.

See also No. 6.

DEVELOPMENT AND PRODUCTION.

331. BROWN, J. L. Oil shale industry of Scotland. *Coal Age*, vol. 12, Sept. 8, 1917, p. 401. Brief account of mining methods and general conditions in the Scotch shale industry.

REFINING AND REFINERIES, *see* Nos. 6, 322.

STATISTICS.

IMPORTS INTO THE UNITED KINGDOM.

332. GREAT BRITAIN, HOME OFFICE, Mines and Quarries. General Report, with statistics, for 1916 (annual), by chief inspector of mines; part 3. Output.
333. PETROLEUM REVIEW. Weekly review of imports, by countries. January-December, 1917.

PRODUCTION OF PETROLEUM.

334. GREAT BRITAIN, HOME OFFICE, Mines and Quarries. General Report, with statistics, for 1916 (annual), by chief inspector of mines; part 4, Colonial and foreign statistics. Gives production statistics for all British colonies.
- See also No. 324.

PRODUCTION OF SHALE IN SCOTLAND.

335. GREAT BRITAIN, HOME OFFICE, Mines and Quarries. General Report, with statistics, for 1916 (annual), by chief inspector of mines; part 3. Output. Gives statistics of oil-shale industry in Scotland.

LEGAL REGULATIONS.

336. PETROLEUM REVIEW. Developing the petroleum deposits of the United Kingdom. Vol. 37, Aug. 25, 1917, pp. 117-118. Gives text of the Government bill, introduced Aug. 15, 1917, to "make provision with respect to the searching and boring for and the getting of petroleum in the United Kingdom, and for purposes connected therewith." Government control is secured and private enterprise favored at the same time. See also *Petroleum World*, vol. 14, September, 1917, pp. 398-400.

ROUMANIA (136).

HISTORICAL REFERENCES AND GEOGRAPHIC OCCURRENCE.

337. BAKER, BENJAMIN. The Russian and Roumanian oil fields. *Evening Post Oil Industry Supplement*, New York, Aug. 31, 1917, pp. 18-20. Review of the oil resources of Russia and Roumania. Emphasizes the points of inefficiency, and present needs of the Russian industry, such as adequate transportation facilities, capital, materials, labor, and new methods of management.

338. NEGULESCU, GOGU. Petroleum industry in Roumania. *Oil Trade Jour.*, vol. 8, April, 1917, p. 104. Brief history of the industry in Roumania, and explanation of how the land is procured for development.
339. VICHNIAK, J. L'industrie du pétrole en Roumanie. (The petroleum industry in Roumania.) *Génie Civil*, t. 70, Jan. 13, 1917, pp. 30-33. Gives location of fields, methods of production, production and export statistics, and the status of the different operating companies.

See also Nos. 43, 44.

GEOLOGY AND ORIGIN, *see* No. 317.

DEVELOPMENT AND PRODUCTION.

340. OIL, PAINT AND DRUG REPORTER. Bringing back the Roumanian oil field after British "demolition." Vol. 92, Aug. 27, 1917, p. 16. Tells how the Germans took paraffin impressions of obstructions in the wells in order to make fishing tools suitable for grasping them.
341. PETROLEUM REVIEW. The destruction of the Roumanian oil fields. Vol. 37, Sept. 15, 1917, pp. 165-167; Sept. 22, pp. 181-183. An official detailed account of how the properties of the Roumanian Consolidated Oilfields (Ltd.), were destroyed to prevent their falling into the enemy's hands.

See also Nos. 338, 339.

STATISTICS, *see* Nos. 318, 339.

RUSSIA (137).

HISTORICAL REFERENCES AND GEOGRAPHIC OCCURRENCE.

342. GUBKIN, I. Petroleum in Russia. *Petroleum Rev.*, vol. 36, May 19, 1916, p. 347; May 26, p. 363; June 2, pp. 383-384; June 16, p. 414; June 23, p. 433; vol. 37, July 7, 1917, p. 7. Translation of a Russian article. Deals with the history of the Russian industry in general, and of the Baku development in particular, with the present situation, and discusses the proper exploitation of the petroleum wealth of Russia in the future.
343. SCIENTIFIC AMERICAN SUPPLEMENT. The oil fields of the Apsheron Peninsula. Vol. 84, Aug. 25, 1917, pp. 127-128. Gives history of petroleum on the peninsula, location of the oil fields, character, and geologic concurrence of the oil, description of surface indications to be found; and tells of the use of natural gas by peasants for burning lime.

See also Nos. 43, 44, 337.

GEOLOGY AND ORIGIN.

344. APRESOV, S. Petroleum on the Apsheron Peninsula. *Petroleum Rev.*, vol. 36, Apr. 14, 1917, p. 267; Apr. 21, p. 283; Apr. 28, p. 299. Translation of an article in *Neftannoie Dielo* on this subject. The first part deals with the relation between petroleum deposits and formations of folds, and the second part with the origin of petroleum in this locality.
345. PETROLEUM REVIEW. Geological investigations of new petroliferous areas in Russia. Vol. 36, May 5, 1917, p. 313. Extract from the report of the Russian geological committee, which recommends for exploitation certain areas on the Apsheron Peninsula.
346. ——— The Terski petroleum deposits. Vol. 37, Oct. 6, 1917, p. 215. Translated from *Neftannoie Dielo*. Describes formation and indications of petroleum deposits in this Province.

347. RUTKOVSKY, A. The Aktechagil watery strata at Bebe-Eibat. *Petroleum Rev.*, vol. 36, Feb. 10, 1917, p. 107. Brief description of conditions in this region as an aid to future boring.
See also No. 343.

DEVELOPMENT AND PRODUCTION.

348. GOGAVA, —. Hand-dug production of petroleum in Russia. *Petroleum Rev.*, vol. 36, May 12, 1917, p. 331; June 16, p. 419. Gives arguments against the prohibition of hand-dug production as planned by the technical committee of the former Russian Government.
349. PETROLEUM REVIEW. The hand-dug petroleum wells in Russia. Vol. 36, Jan. 20, 1917, pp. 47-48; Jan. 27, p. 69. Gives arguments why hand-dug wells should not be discouraged, as reported to the Russian technical petroleum control committee.

PROPERTIES AND THEIR DETERMINATION, *see* Nos. 9, 343.

UTILIZATION.

350. PETROLEUM REVIEW. Fuel consumption on the Russian railways. Vol. 36, Apr. 14, 1917, p. 265. Gives figures showing the consumption of coal, wood, and petroleum, 1904-1913, 1915 and 1916.
See also No. 343.

STATISTICS.

PRICES.

351. PETROLEUM REVIEW. Home and foreign market intelligence gives weekly report of prices. January-December, 1917.
See also Nos. 318, 350.

TURKEY (138).

OCCURRENCE, *see* Nos. 43, 44.

OTHER COUNTRIES (139).

FRANCE.

REFINING AND REFINERIES, *see* No. 832.

UTILIZATION.

352. GÉNIE CIVIL. L'emploi de l'alcool industriel et des hydrocarbures comme carburants. (The use of industrial alcohol and hydrocarbons in carburetors.) T. 71, Oct. 6, 1917, pp. 225-228. Résumé of part of an official report on the liquid fuel resources of France, including alcohol, mixtures of alcohol, ether, etc., and petroleum, natural gas, and oil shales.

ITALY.

GEOGRAPHIC OCCURRENCE.

353. PETROLEUM WORLD. The petroleum industry of Italy. Vol. 14, December, 1917, p. 556. Gives production and import figures, and names localities where oil indications have been found.
See also Nos. 43, 44.

PROPERTIES AND THEIR DETERMINATION.

354. RODANO, A. G. Petroleum of Neviano de' Rossi. *Annali Chim. Appl.*, vol. 8, 1917, pp. 11-12. *Chem. Abs.*, vol. 11, Dec. 10, 1917, pp. 3424-3425. Gives properties, distillation test, etc.

REFINING AND REFINERIES.

355. RODANO, A. G. Utilization of Italian products (petroleum and tar oils) in the preparation of benzol. *Annali Chim. Appl.*, vol. 8, 1917, pp. 7-11; *Jour. Soc. Chem. Ind.*, vol. 36, Oct. 31, 1917, p. 1091. Tells of experiments which showed the possibility of the use, by the cracking process, of crude petroleum from Ripi, Italy, and of mixtures of this petroleum with tar oil for the production of benzol.

STATISTICS.

PRODUCTION OF PETROLEUM AND ASPHALT.

356. *REVISTA DEL SERVIZIO MINERARIO*. Gives annual statistics for Italy. *See also* No. 318.

SWITZERLAND.

DEVELOPMENT AND PRODUCTION.

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ASIA (140).

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OCCURRENCE, *see* Nos. 43, 44.

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GEOLOGY.

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PROPERTIES AND THEIR DETERMINATION, *see* No. 361.

STATISTICS.

GENERAL REVIEW.

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IMPORTS.

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PRODUCTION OF PETROLEUM.

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See also No. 357.

JAPAN (143).

OCCURRENCE, *see* Nos. 43, 44.

DEVELOPMENT AND PRODUCTION.

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366. OIL AGE. Hand-dug wells in Higashiyama. Vol. 13, July, 1917, p. 22. Quoted from the Petroleum News, of Tokyo. Describes primitive method of diggings wells in close proximity to the modern method of operation in the same field. *See also* Petroleum Rev., vol. 37, Sept. 1, 1917, p. 135.

STATISTICS, *see* No. 357.

OTHER COUNTRIES (149).

PERSIA.

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AFRICA (150).

OCCURRENCE, *see* Nos. 43, 44.

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- 368b.** SCHWARZ, E. H. L. Notes on the geology of Natal. Trans. Geol. Soc. South Africa, vol. 19, Jan.-Dec., 1916 (published 1917), pp. 46-53. Describes carbonaceous shales.
- 369.** WAGNER, P. A. Mineral oil, solid bitumen, natural gas, and oil shales. South African Jour. Ind., vol. 1, October, 1917, p. 126.

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- 370.** UNITED STATES GEOLOGICAL SURVEY. Mineral Resources, part 2. Non-metals. Annual production figures for Egypt.

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371. UNITED STATES GEOLOGICAL SURVEY. Mineral Resources, part 2. Nonmetals. Annual production statistics for principal producing countries.

AUSTRALIA (161).

GEOLOGY AND ORIGIN.

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UTILIZATION.

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STATISTICS, see No. 371.

BORNEO, JAVA, AND SUMATRA (162).

OCCURRENCE, see Nos. 43, 44; STATISTICS, see No. 371.

NEW GUINEA (163).

GEOLOGY AND ORIGIN.

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NEW ZEALAND (164).

STATISTICS, *see* No. 371.

PHILIPPINE ISLANDS (165).

OCCURRENCE, *see* Nos. 43, 44.

STATISTICS.

IMPORTS OF PETROLEUM.

- 378.** UNITED STATES BUREAU OF FOREIGN AND DOMESTIC COMMERCE. Monthly summary of foreign commerce of the United States gives quantity and value of crude and refined mineral oils exported to the Philippines.

GEOLOGY AND ORIGIN (200).

GENERAL AND MISCELLANEOUS GEOLOGY (210).

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- See also* No. 193.

GEOLOGIC STRUCTURE (240).

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- See also* Nos. 105, 127.

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wells in the different oil fields of the United States and Mexico. Concludes that induced porosity is usually much more important in oil accumulation than original interstitial porosity; that hydrostatic water action is an important factor in accumulation; and that the anticlinal theory is re-established.

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See also No. 396.

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- See also* Nos. 140, 160, 211, 212.

DEVELOPMENT AND PRODUCTION (300).

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DRILLING (METHODS, TOOLS, AND EQUIPMENT) (310).

DRILLING METHODS.

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PERCUSSION.

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PATENT.

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ROTARY.

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- See also* Nos. 108, 409.

DRILLING TOOLS.

PATENT.

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- See also* No. 408.

PERCUSSION.

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430. WAGNER, WARREN. Casing spear. U. S. patent 1243904, Oct. 23, 1917.
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- 435. WRIGHT, C. S. Underreamer. U. S. patent 1242508, Oct. 9, 1917.

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- 442. DOUBLE, EDWARD. Rotary bit. U. S. patent 1224287, May 1, 1917.
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- 457. THERIOT, J. C. Safety attachment for well-drilling tools. U. S. patent 1212848, Jan. 16, 1917.
- 458. WATTS, H. J. Drill. Canadian patent 178854, Aug. 21, 1917.
- 459. ——— Drill or boring member. U. S. patent 1241176, Sept. 25, 1917.
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DRILLING EQUIPMENT.

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See also Nos. 408, 477.

RIGS AND DERRICKS AND PARTS THEREOF.

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471. THOMPSON, J. V. Oil-well drilling apparatus. U. S. patent 1225891, May 15, 1917.
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POWER.

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CASING AND FITTINGS.

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See No. 486.
477. PETROLEUM WORLD. The single-bail elevator. Vol. 14, June, 1917, pp. 270-271. Describes and illustrates device for rapid handling of large casing, with safety device for preventing accidents.

PATENTS.

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481. FOSTER, W. H. Strainer. U. S. patent 1229437, June 12, 1917.
482. HANSON, H. E. Well screen. U. S. patent 1223969, Apr. 24, 1917.
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492. SWEENEY, M. L. Pipe or well casing. U. S. patent 1240098, Sept. 11, 1917.
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494. WALKER, H. B. Release joint for well casings. U. S. patent 1243364, Oct. 16, 1917.
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PROTECTION AGAINST CORROSION.

See No. 475.

CONTROL OF WATER AND WASTE.

CEMENT.

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 499. MACK, P. H. Oil-well packer. U. S. patent 1248881, Dec. 4, 1917.
 500. ——— Well packer, U. S. patent 1248882, Dec. 4, 1917.

MUD FLUID.

OTHER METHODS.

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See also No. 497.

CONTROL OF WELLS.

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See also Nos. 162, 539.

USE OF EXPLOSIVES, SHOOTING (PATENT).

503. McAVOY, J. E. Method of shooting oil wells. U. S. patent 1248689, Dec. 4, 1917.

RECORDS OF FORMATION, COST, ETC.

504. MATTESON, W. G. The need and advantages of a national bureau of well-log statistics. Bull. Am. Inst. Min. Eng., February, 1917, pp. 287-290; discussion, April, 1917, pp. 635-640; May, pp. 833-834; June, pp. 986-987. Transactions, vol. 56, 1917, pp. 881-884; discussion, pp. 884-891. Using as an example the recently passed California State law providing for the inspection of oil and gas wells and for the keeping of accurate well logs, a Federal law of similar requirements is suggested as an aid to future development and to the conservation of the products.
 505. ——— The practical value of oil and gas bureaus. Bull. Am. Inst. Min. Eng., June, 1917, pp. 979-981; discussion, October, pp. 1857-1862; January, 1918, pp. 75-88. Trans., vol. 57, 1918, pp. 1010-1012; discussion, pp. 1012-1033. Emphasizes the practical value of accurate well logs and of their supervision by national or State bureaus, and urges the establishment of bureaus similar to those of California and Oklahoma.
See also Nos. 81, 140, 164, 285.

PRODUCTION (METHODS, EQUIPMENT, AND OPERATIONS) (320).

See Nos. 208, 405.

PUMPING OIL WELLS.

TOOLS AND EQUIPMENT.

506. BARNES, R. M. Central-power and jack-pumping plants for operation of oil wells. West. Eng., vol. 8, May, 1917, pp. 177-182; June, pp. 223-227. Abstract of a thesis for the Department of Civil Engineering, University of California. A detailed description of the system based on an extensive field investigation. Considers the design and methods of construction of the different parts of the system, and gives bills of material and approximate costs.

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508. BOBINSON, L. W. Deep-well pump. U. S. patent 1230554, June 19, 1917.
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- See also* Nos. 473, 474, 506.

SPECIAL PUMPING METHOD (PATENT).

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CARE OF PRODUCING OIL WELLS.

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522. DEATS, G. W. Apparatus for cleaning deep wells. U. S. patents 1235294, July 31, 1917; 1235770, Aug. 7, 1917.

HEATING (PATENT).

523. TRUMAN, VIN, and SKILLEN, G. L. Oil-well heater. U. S. patent 1232736, July 10, 1917.

OPERATION OF WELLS PRODUCING WATER, *see* Nos. 116, 209, 210; DETERMINATION OF SOURCE OF WATER, *see* Nos. 53, 84.

WATER ANALYSES.

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TOOLS AND EQUIPMENT (PATENTS).

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GAS WELLS.

See Nos. 89, 475.

RECORDS AND COSTS, *see* Nos. 157, 406, 506, 519.

PRODUCTION (GATHERING AND TREATMENT) (330).

GENERAL (PATENTS).

527. SQUIRES, FREDERICK. Apparatus and method for recovering oil and gas. U. S. patent 1249232, Dec. 4, 1917.
528. ——— Method of recovering oil and gas. U. S. patent 1238355, Aug. 28, 1917.

OIL.

GAGING AND SAMPLING.

529. JOHNSON, R. H., and BERNARD, W. E. A feasible plan for gaging individual wells. Bull. Am. Inst. Min. Eng., June, 1917, pp. 955-957; Discussion, January, 1918, pp. 100-101. Trans., vol. 57, 1918, pp. 1050-1052; discussion, pp. 1052-1053. Enumerates the advantages of recording the rate of production of individual wells, and gives two diagrams showing a plan for gaging the wells on a lease in rotation.

PATENT.

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GAS AND VAPORS, *see* Nos. 319, 527, 528.

COMPRESSORS AND CONDENSERS.

531. WEYMOUTH, T. B. Efficiency in the operation of gas compressing stations. Proc. Nat. Gas Assoc. Am., vol. 9, 1917, pp. 93-101; discussion, pp. 101-110. Nat. Gas and Gasoline Jour., vol. 11, June, 1917, pp. 142-147. Discusses waste and inefficiency in the operation of early compressor stations, and describes the more economical methods of the present, such as the use of proper gas-measuring instruments, the oiling system, use of indicators, and economy of fuel and labor.

532. WYER, S. S. Development of the law relating to the use of gas compressors in natural gas production. Trans. Am. Inst. Min. Eng., vol. 54, 1916, pp. 301-317; discussion, pp. 318-324. Published first in Bull. Am. Inst. Min. Eng., February, 1916, pp. 263-279; discussion, May, 1916, pp. 946-952.

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534. SCHARPENBERG, C. C. Gas trap. U. S. patent 1226913, May 22, 1917.

PRODUCTIVENESS OF OIL AND GAS WELLS AND LANDS (340).

NATURAL FACTORS.

INFLUENCE OF WATER, *see* Nos. 211. 212; CAUSES OF DECLINE, *see* Nos. 72. 41.

ARTIFICIAL FACTORS, STIMULATION OF PRODUCTION.

INCREASE OF PRESSURE BY AIR OR GAS.

535. LEWIS, J. O. Methods for increasing the recovery from oil sands. Bureau of Mines Bull. 148, 1917. 128 pp. Describes particularly the application of compressed air.
536. WESTERN ENGINEERING. The Marietta compressed-air process for increasing the production of oil wells. Vol. 8, May, 1917, p. 172. Short discussion of the process taken from paper by J. O. Lewis which was read before the Petroleum Club of the University of California.
- USE OF WATER, *see* No. 83.

ESTIMATING CONTENT OF OIL AND GAS LANDS.

537. PACK, R. W. The estimation of petroleum reserves. Bull. Am. Inst. Min. Eng., August, 1917, pp. 1121-1134; discussion, October, pp. 1866-1868. Trans., vol. 57, 1918, pp. 968-981; discussion, pp. 981-983. Met. and Chem. Eng., vol. 17, Sept. 1, 1917, pp. 227-232. Considers briefly the saturation method and, in greater detail, the production curve method. Concludes that the latter should be used in estimating reserves in producing fields; and that untested fields should be compared with producing areas which they resemble geologically, after the reserves in those areas have been estimated by the production curve method. Describes particular application of the method to a California field.
- See also* No. 401.

WASTES AND CONSERVATION (350).

538. BALL, M. W. Adequate acreage and oil conservation. Proc. Am. Min. Congress. vol. 19, 1916 (published 1917), pp. 322-333. After considering briefly the necessity for conservation, discusses glaring forms and causes of waste and loss of oil and gas and reasons for high price. Concludes that the fundamental cause is inadequate acreage which results in too close proximity of neighboring tracts in process of development and in premature production. Makes plea for the creation of popular sentiment in favor of adequate acreage and of eventual legislation toward this end.

539. JOHNSON, R. H. Legal and economic factors in the conservation of oil and gas. Proc. Second Pan American Scientific Congress 1915-1916 (Washington, 1917), vol. 8, Mining, Metallurgy, Economic Geology and Applied Chemistry, pp. 103-107; discussion, pp. 108-113. Discusses leasing and royalty methods, leasing and operation of public lands, control of wells and efficient operation of pipe lines to prevent waste, use of compressor plants, methods of rate fixing for gas, and general economy in utilization of oil and gas.

MINING SOLID BITUMENS (360).

540. ENGINEERS' CLUB OF PHILADELPHIA, PROCEEDINGS. The asphalt industry. Vol. 34, January, 1917, pp. 11-17. Mining, refining, and uses of asphalt are discussed.

FINANCIAL DETAILS (APPRAISEMENTS, ROYALTIES, CONTRACTS, COSTS, PRICES) (390).

541. SMITH, C. G. Cost accounting for oil producers. Bull. 158, Bureau of Mines, 1917. 123 pp. Describes and discusses balance sheets, profit and loss statements, and bookkeeping methods peculiarly adapted to the oil industry.
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See also Nos. 190, 401, 539.

TRANSPORTATION, STORAGE AND DISTRIBUTION (400).

TRANSPORTATION, *see* Nos. 404, 405, 1041.

PIPE LINES (OIL OR GAS).

543. BAXTER, F. R. The storage and transportation of liquids. *Jour. Ind. and Eng. Chem.*, vol. 9, October, 1917, pp. 978-979. A brief history of the development in the United States of water and pipe-line transportation of oil, and a short review of present methods of oil storage.
544. PETROLEUM WORLD. The trans-Atlantic pipe-line scheme. Vol. 14, March, 1917, pp. 124-125; August, pp. 361-362. Criticism of the scheme because of the strength of pipe necessary to stand the external pressure of such a line, and the inventor's reply. (For original description of the scheme, *see* Murphy, S. J. The trans-Atlantic pipe line. *Petroleum World*, vol 13, December, 1916, p. 588.)

CONSTRUCTION AND MAINTENANCE.

545. CEMENT ERA. Concrete natural gas mains. Vol. 15, November, 1917, p. 45. Tells of plan to pipe gas from the Terrebonne field, Louisiana, to New Orleans, in double concrete pipes of large diameter.
546. CLARKE, M. S. Welding gas mains. *Nat. Gas and Gasoline Jour.*, vol. 11, December, 1917, pp. 349-350. Discusses the advantages of welded pipe, describes the apparatus used in the Oxweld process, gives its cost, and explains a few applications.
547. LUNGREN, E. E. Welding steel mains. *Nat. Gas and Gasoline Jour.*, vol. 11, May, 1917, pp. 116-121. Discusses the advantages of oxyacetylene welding, apparatus and material needed, and testing the joints. Gives tables of cost data, including comparative costs of screwed and welded lines.
548. WESTERN ENGINEERING. Costs of oxyacetylene cutting and welding. Vol. 8, April, 1917, p. 154. Quotes cost tables issued by the National Tube Co. *See also* Nos. 142, 215, 475.

PROTECTION AGAINST CORROSION.

549. NATURAL GAS AND GASOLINE JOURNAL. Nature destructive to pipe lines. Vol. 11, January, 1917, pp. 11-13. Results of an investigation in the vicinity of Cleveland, Ohio. Discusses causes and prevention of corrosion. *See also* No. 475.

STATION EQUIPMENT.

550. NEWTON, N. A. The development of machinery for transportation of oil and gas. *Oil City Derrick Supplement*, Dec. 15, 1917, pp. 17, 19, 21, 23. Outlines improvements in methods of handling and transporting crude oil, particularly in regard to pumps and pumping engines.

LINE EQUIPMENT AND TOOLS.

551. KERR, T. H. Automatic orifice meter control. *Nat. Gas and Gasoline Jour.*, vol. 11, November, 1917, pp. 321-322. Describes with illustrations, an orifice meter with a differential relief valve of the positive-opening type controlled by gas pressure and the balancing of forces between a differential diaphragm and a weighted lever.

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552. BRADFORD, C. W. Antitheft device for contents of gas and other pipeline systems. U. S. patent 1239870. Sept. 11, 1917.
553. DURBIN, V. S. Swivel coupling for pipe lines. U. S. patent 1228541, June 5, 1917.
554. HALL, G. C., and BRADSHAW, ALFRED. Valve for pipes for conducting liquid and gaseous fluids. U. S. patent 1222758, Apr. 17, 1917.

See also Nos. 609, 1030.

RECORDS AND STATISTICS, *see* No. 590; FINANCIAL COSTS, *see* Nos. 546, 547, 548, 590.

TANK CARS AND TANK WAGONS (CONSTRUCTION AND MAINTENANCE).

555. RAILWAY AGE GAZETTE. Large capacity tank cars for the Santa Fe. Vol. 63, Sept. 14, 1917, pp. 467-469. Description with diagrams of 12,000-gallon tank cars to be used for fuel oil designed according to the specifications of the Master Car Builders' Association for Class III tank cars as amended in 1916. Calls attention to several novel details of design.
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558. DE MERITT, L. M., and ZINK, J. H. Tank car. U. S. patent 1237484, Aug. 21, 1917.
559. WAUGH, J. M. Tank car. U. S. patent 1248763, Dec. 4, 1917.

WATER TRANSPORTATION, *see* Nos. 7, 8, 543.

TANK STEAMERS (CONSTRUCTION—PATENTS).

560. ISHERWOOD, J. W., and STEWART, J. W. Tank vessels. English patent 16834, Mar. 28, 1917. Application dated Nov. 30, 1915.
561. LAING, HUGH, and ASHBY, E. W. Ship for carrying liquid cargoes in bulk. U. S. patent 1234675, July 24, 1917.
562. LYNN, J. J. Ship for oil and molasses. Canadian patent 174282, Jan. 2, 1917.
563. YARROW, H. E. Oil tank ships. English patent 105727, Apr. 26, 1917. Application 17697, Dec. 8, 1916.
- See also* Nos. 7, 633.

STORAGE (420).

564. JAMES, G. B. Oil storage. *Proc. Am. Min. Congress*, vol. 19, 1916 (published 1917), pp. 307-317. *Nat. Fire Protect. Assoc. Quarterly*, vol. 10, January, 1917, pp. 260-270. Describes briefly present methods of field storage. Discusses losses by evaporation, recommending the use of steel roofs on tanks; and by fire, giving causes and methods of fire protection, and suggesting further precautions.

See also Nos. 543, 611, 1029, 1041.

TANKS.

565. LANGARICA, A. Cimentación de tanques de almacenamiento de petróleo. (Foundation of petroleum storage tanks.) *Bol. del Petróleo*, vol. 4, November, 1917, pp. 424-428. Discusses methods of construction and materials.

PATENTS.

566. FERNÁNDEZ, ALPHONSO. Fuel tank. United States patent 1237891, Aug. 21, 1917.

STEEL AND IRON.

567. HERRICK, H. N. Tank earthwork. *Min. and Sci. Press*, vol. 114, Apr. 14, 1917, pp. 508, 510. *West. Eng.*, vol. 8, June, 1917, pp. 218-219. Gives formulas and diagrams for calculating the quantities of earthwork involved in the preparation of sites for large steel tanks.
568. JOBSON, ARTHUR. Dimensions of storage tank for economical design. *Eng. News-Rec.*, vol. 78, May 3, 1917, pp. 261-262. Gives formula for determining unit costs of specially designed tank or small reservoir with concrete bottom and steel sides.

PATENT.

569. LEWIS, HOWARD. Lubricating oil storage tank. U. S. patent 1246819, Nov. 13, 1917.

CONCRETE.

570. CAMPBELL, H. C. The use of concrete for oil storage tanks. *Min. and Oil Bull.*, vol. 3, November, 1917, pp. 361-363, 384. Gives advantages of concrete tanks from a structural and economic standpoint, and mentions construction requirements. (See also *Nat. Petroleum News*, vol. 9, November, 1917, pp. 21-22.) Adds experience of several companies using concrete storage.
571. MENSCH, J. L. Concrete storage for the oil industry. *Petroleum*, vol. 3, September, 1917, pp. 49, 51. Calls attention to important details of construction of modern storage tanks and reservoirs, and to their economy.
572. NATIONAL PETROLEUM NEWS. Concrete storage practical for heavy oils. Vol. 9, August, 1917, pp. 28, 30, 32, 34. Discusses advantages of this kind of storage and important features of construction in concrete tanks.
573. SHAPINSKY, R. D. Reinforced concrete storage for road oil. *National Petroleum News*, vol. 8, February, 1917, pp. 58, 60-61. Describes underground vats of 50,000 gallons capacity, composition of the concrete, and arrangement of oil and steam lines.
574. STROYER, R. N. Reinforced concrete and oil. *Petroleum Rev.*, vol. 37, Oct. 6, 1917, pp. 213-214. Discusses the use of reinforced concrete for oil storage tanks and tank ships. Since mineral oils and tar have been found by investigation to have no deleterious effect on cement or concrete, these materials are shown to be practicable for such purposes.

PATENT.

575. MUNN, M. J. Crude oil storage tank. Canadian patent 176123, Apr. 3, 1917. English patent 103276, Jan. 18, 1917. Application 12894, Sept. 12, 1916.

See also Nos. 214, 568.

RESERVOIRS (CONCRETE LINED), *see* No. 571.

STORAGE OF BUNKER OILS (PATENT).

576. LAURENTI, CESARE. Liquid fuel reservoir in submarine vessel. U. S. patent 1219115, Mar. 13, 1917.

TANK AND RESERVOIR EQUIPMENT (PATENTS).

577. AUGENBRAUN, P F. Closure for gasoline or other liquid tanks. U. S. patent 1212878, Jan. 16, 1917.
578. BORYSZEWSKI, JOSEPH, JR. Gasoline tank and gage for same. U. S. patent 1249010, Dec. 4, 1917.
579. BOYCE, LEONORA. Gasoline-tank filler and gage. U. S. patent 1217693, Feb. 27, 1917.
580. FARDON, C. C. Storage tank. U. S. patent 1218600, Mar. 6, 1917.
581. HURLBRINK, ERNST. Apparatus for discharging liquids. U. S. patent 1243298, Oct. 16, 1917.
582. MCCRABB, W. D. Automatic shut-off for oil tanks. U. S. patent 1235825, Aug. 7, 1917.
583. MIRES, B. A. Attachment for liquid-fuel tanks. U. S. patent 1231774, July 3, 1917.
584. RAYMOND, G. E. Air pump for gasoline tanks. U. S. patent 1222030, Apr. 10, 1917.

See also Nos. 587, 599, 600, 602, 603, 607, 608, 615, 618-622, 624-628, 630, 631.

TEMPORARY AND SMALL CONTAINERS.

585. ADKINS, L. R. Transportation and storage of liquids in small packages. Jour. Ind. and Eng. Chem., vol. 9, Oct., 1917, pp. 979-980. Describes small containers, such as barrels and tin cans in use at the present time for carrying and storing petroleum and its products.

EQUIPMENT (PATENT).

586. CHYNOWETH, H. W. Gasoline tank and filter. U. S. patent 1235438, July 31, 1917.

See also Nos. 598, 601, 604.

LOSSES.

587. GARDNER, H. A. Paint researches and their practical application. Washington, D. C., Press of Judd and Detweiler (Inc.), 1917. 384 pp. Discusses (pp. 262-263) the heat-reflecting properties of colors as shown by experiments with metal tanks containing benzine. (See also Circular 44, Paint Manufacturers' Association of the United States, Educational Bureau, Scientific Section, 1917.) Sci. Am., vol. 116, Feb. 10, 1917, p. 151. (From paper read before the Pennsylvania State Association of Master Painters and Decorators.)

588. NATIONAL PETROLEUM NEWS. Cutting the gasoline loss to 1 per cent. Vol. 9, November, 1917, pp. 34, 36, 38. Describes devices adopted by various companies to reduce loss from evaporation in storage, and the need for careful handling by plant employees.
589. WISE, K. M. The conservation of petroleum. Oil Age, vol. 13, Nov., 1917, pp. 10-15. Describes the Farr system of storage and handling as a preventive against loss by evaporation and fire.
- See also* Nos. 539, 564, 580, 619.
- RECORDS AND STATISTICS, *see* Nos. 567, 590; FINANCIAL COSTS, *see* Nos. 568, 590.

MEASUREMENT OF VOLUMES AND WEIGHTS, GAGING AND METERING (430).

590. DONOGHUE, A. M. Crude petroleum transportation and accounting. Texaco Star, vol. 4, July, 1917, pp. 7-10. Explains methods of measuring and gaging oil in its transportation from wells to settling tanks, and through pipe lines and pump stations to large steel tanks for storage; also methods used in financial accounting and in recording of runs by pipe lines.
591. FISHER, F. P. Establishing a standard of measurement for natural gas in large quantities. Trans. Am. Soc. Mech. Eng., vol. 38, 1916 (New York, 1917), pp. 241-280; discussion, pp. 280-284. Published first in Jour. Am. Soc. Mech. Eng., vol. 38, September, 1916, pp. 681-692; discussion, pp. 692-694. Deals with the methods used in the Mid-Continent field by a company which operates over 1,200 miles of gas pipe lines. Describes, with their advantages and disadvantages, various means of measuring gas, and a specific problem of loss in this field, discussing particularly the use of large capacity measurements with orifice meters.
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598. DIMOND, M. M. Fluid gage. U. S. patent 1231339, June 26, 1917.
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 - 603. OESCHGER, W. I. Tank gage. U. S. patent 1211482, Jan. 9, 1917.
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 - 605. ROGERS, J. F. Fuel-tank gage. U. S. patent 1225178, May 8, 1917.
 - 606. ROSENDAHT, N. M. Liquid-metering tank. U. S. patent 1210988, Jan. 2, 1917.
 - 607. STEPHAN, AUGUST. Oil measure for tanks. Canadian patent 179950, Oct. 23, 1917.
 - 608. WENTZ, ORVILLE. Tank gage. U. S. patent 1238231, Aug. 28, 1917.
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- See also* Nos. 551, 578, 579.

FIRE HAZARDS AND PREVENTION (440).

- 610. THE BUREAU FOR THE SAFE TRANSPORTATION OF EXPLOSIVES AND OTHER DANGEROUS ARTICLES. Report of the chief inspector, February, 1917. 104 pp. Report for the year 1916, including, in addition to statistics in regard to fires in the transportation of gasoline and other inflammable liquids, details of fires and accidents during the year.
- 611. COLWELL, P. A. Precautions in fuel-oil storage. *Power*, vol. 45, June 26, 1917, pp. 886-887. Abstract of paper read before the Providence, R. I., Engineering Society. Describes the proper method of storing fuel oil, and precautions such as using underground tanks inclosed in concrete, drawing all oil back into the tank, and providing tanks with automatic fire extinguishers.
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- 615. PETROLEUM. Holmes perfects oil-tank fire extinguisher. Vol. 4, December, 1917, p. 66. Describes invention of O. J. Holmes, to be placed at the base of a tank.
- 616. PETROLEUM REVIEW. The Blundell fire extinguishing system. Vol. 36, Mar. 17, 1917, p. 201. Describes system of ventilating, steaming, and extinguishing fire on board oil tankers, or on land in oil storage.
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- 619. CLIFTON, H. W., and CLIFTON, GEORGE. Storage-oil-tank protector. U. S. patent 1233028, July 10, 1917.

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623. ——— Quick-acting foam compound for extinguishing fires. U. S. patent 1247803, Nov. 27, 1917.
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631. SLATER, W. A. Fire extinguisher (for oil tanks). U. S. patent 1236220, Aug. 7, 1917.
- See also* Nos. 141, 564, 589.

LOCAL DISTRIBUTION (450).

PATENT.

632. KERN, E. N. Liquid fuel dispensing apparatus. U. S. patents 1210811 and 1210812, Jan. 2, 1917.

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633. AMERICAN BUREAU OF SHIPPING. Rules for the classification and construction of steel ships. New York, 1917. 141 pp. Section 30 (pp. 85-91) gives rules for ships intended to carry oil in bulk.
- See also* No. 556.

MISCELLANEOUS (490).

634. MOHRHARDT, L. E. Flood lighting in the oil fields for police protection. Gen. Elec. Rev., vol. 20, October, 1917, pp. 816-817. One thousand oil tanks scattered over an area of 50 square miles are protected by the installation of flood lights.
- See also* No. 541.

PROPERTIES AND THEIR DETERMINATION (500).

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GENERAL, *see also* Nos. 193, 404; PHYSICAL, *see* No. 1039.

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635. SCOTT, JAMES. Petroleum under the microscope. 1. Sulphurous petroleum—a microscopical inspection. 2. Petroleum jelly—its microscopical formation. 3. The crystallization of paraffin wax. 4. Limestone in relation to oil. 5. Cholesterin as proof of organic origin. 6. Sulphuric acid and caustic soda. 7. Oil sands and sandstones. 8. Ozkerite or natural paraffin wax. Petroleum World, vol. 14, May, 1917, pp. 206-207; June, pp. 263-265; July, pp. 296-298; August, pp. 347-349; September, pp. 396-397; October, pp. 441-443; November, pp. 490, 492; December, pp. 528-529.

See also No. 707.

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See also Nos. 136, 216, 698, 699, 702, 708, 716, 750, 1372.

THERMAL, *see* No. 712; SPECIFIC HEAT AND LATENT HEATS, *see* Nos. 743, 778.

BOILING POINTS AND VAPOR PRESSURES. EVAPORATION, VOLATILITY, FRACTIONAL DISTILLATION.

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637a. DIETERICH, K. (Evaporation velocities and evaporation curves of motor fuels.) Petroleum Ztschr., Jahrg. 12, 1917, pp. 676-677. Chem. Zentr., 1919, II, p. 31. Jour. Soc. Chem. Ind., vol. 38, April 30, 1919, p. 244A.

See also Nos. 683, 696, 702, 705, 716, 746, 747, 748, 750, 1372, 1417.

MELTING POINTS, CRYSTALLIZATION, COLD TESTS, CONGEALING POINT, *see* Nos. 638, 679, 689, 702, 736.

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- 638a. BATTLE, J. R. Lubricating engineers handbook. A reference book of data, tables, and general information for the use of lubricating engineers, oil salesmen, operating engineers, mill and power plant superintendents, and machinery designers, etc. Philadelphia, London, J. B. Lippincott Company, 1917. 333 pp. Gives properties and methods of testing lubricants, and methods of lubricating various kinds of machinery.
639. ——— Lubrication reduces loss of energy due to friction. *Nat. Petroleum News*, vol. 9, November, 1917, pp. 86-87. Explains briefly the purpose of lubrication, and enumerates the qualities necessary in an efficient lubricant.
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641. CHURCH, A. T. Forced lubrication. *Jour. Am. Soc. Naval Eng.*, vol. 29, August, 1917, pp. 443-450. Includes discussion of qualities necessary in lubricating oils, and tests of their lubricating value.
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- See also Nos. 636, 652, 685, 689, 694, 714, 715, 724, 752, 753, 754, 756, 1436.

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- 653a. ——— The determination of absolute viscosity by short-tube viscosimeters. Bureau of Standards Tech. Paper 100, 1917. 55 pp. Says that Engler and Saybolt viscosimeters, usually employed in the oil trade, are unsuitable because of their short outlet tubes.
654. ——— Resistance of an oil to emulsification. Bureau of Standards Tech. Paper 86, 1917. 37 pp. Gives proposed emulsification test for oils, more definite than tests previously described and calculated to increase the efficiency of lubricating oils in forced-feed lubrication. Describes method and apparatus used, explains the theory of emulsification, and shows the relation between demulsibility and other physical properties of oils, and between demulsibility and chemical tests. Concludes that oils of high demulsibility give most satisfactory service. For preliminary account of test, see *Proc. Am. Soc. Test. Materials*, vol. 16, part 2, 1916, pp. 248-265.
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See also Nos. 215, 638, 694, 702, 710, 725, 726, 728, 731, 1039, 1415, 1416.

OTHER PROPERTIES OF SOLIDS, see Nos. 686, 688, 692, 706, 733, 736, 762, 1417.

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THERMOCHEMICAL.

FLASH AND BURNING POINTS, IGNITION POINTS, AND IGNITION MIXTURES.

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662. McDAVID, J. W. The temperature of ignition of gaseous mixtures. Jour. Chem. Soc., vol. 111, November, 1917, pp. 1003-1015. Gives values for mixtures of air with coal gas, ethylene, petrol, benzene, ether, and other gases.
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See also Nos. 638, 649, 687, 702, 717, 721, 735, 1081, 1417.

CALORIC POWER AND CALORIMETRY.

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THERMAL DECOMPOSITION OR CRACKING.

669. EGLOFF, GUSTAV, and MOORE, R. J. The cracking of an aromatic base oil, the temperature factor at constant rate under pressure. *Jour. Ind. and Eng. Chem.* vol. 9, Jan. 1, 1917, pp. 40-42. A study of the formation of benzene and toluene from an aromatic base oil—solvent naphtha—at temperatures from 500-800° C., at the rate of flow of 15 gallons per hour, and 11 atmospheres pressure. Conclusion is that an aromatic base oil—solvent naphtha—is the most satisfactory, for the resulting benzene and toluene are of a high degree of purity, and the process is easy.
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HEAT OF FUSION.

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674. VON KOZICKI, G., and VON PILAT, S. (Heat of fusion of paraffin wax.) *Chem. Umschau*, 71, 1917. *Chem. Ztg.*, Jahrg. 42, 1918, Rep., p. 147. *Jour. Soc. Chem. Ind.*, vol. 37, Nov. 30, 1918, p. 681A.

ELEMENTARY ANALYSIS (SULPHUR).

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676. FRANCIS, C. K. and CRAWFORD, C. W. The detection and determination of sulphur in petroleum. *Jour. Ind. and Eng. Chem.*, vol. 9, May, 1917, pp. 479-481. Describes investigation to determine a reliable test, and a method for making accurate determinations without complicated or expensive apparatus. The methylene blue test detects any form of sulphur in petroleum with extreme delicacy. Fusion with sodium peroxide in a bomb and the modified Dammer combustion method determine sulphur in crude oil.
677. MARCUSSE, J. (Sulphur and oxygen compounds of mineral oils.) *Mitt. k. Materialprüf.*, 1917, pp. 374-380; *Ztschr. angew. Chem.*, Jahrg. 31, 1918, Ref., p. 62. *Jour. Soc. Chem. Ind.*, vol. 37, June 29, 1918, p. 329A. (Abstract.) Heavy oils contain more sulphur than light oils. Compounds of sulphur and oxygen are in dark oils mainly, among solid resinous and asphaltic constituents, the latter containing a higher percentage of sulphur and oxygen than resins.

See also Nos. 216, 635, 702, 750, 973, 1409.

ANALYTICAL NUMBERS (IODINE, BROMINE, SAPONIFICATION, ETC.,) see Nos. 702, 711, 712; HYDROCARBONS, HYDROCARBON DERIVATIVES, see No. 660; OXYGEN COMPOUNDS, see No. 677; CHOLESTERIN, see No. 635; HALOGEN COMPOUNDS, see No. 709; WATER AND SOLID IMPURITIES, SAND, B. S., ETC., see No. 655; ASH CONTENT, see No. 736.

DETECTION OF MIXTURES AND ADULTERANTS.

678. CONDELLI, S. (The detection of mineral oil, vaseline and paraffin in fish oil. Preliminary note.) *Staz. sper. agr. ital.*, volume 50, 1917, pp. 73-75. (*Chem. Abs.*, vol. 12, Feb. 20, 1918, p. 433. Method described of detecting presence of a mineral oil or vaseline and of the measurement of the amount.
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680. HOLDE, D. (Colloidal graphite in oil.) *Chem. Ztg.*, Jahrg. 41, 1917, pp. 32-33. *Jour. Soc. Chem. Ind.*, vol. 36, Feb. 28, 1917, p. 214. Describes method of determination.

See also Nos. 691, 707.

MISCELLANEOUS AND SPECIFIC TESTS.

681. MEIGS, J. V. Observations on the action of sulphur monochloride on bituminous and tarry substances and hydrocarbon oils. *Jour. Ind. and Eng. Chem.*, vol. 9, July, 1917, pp. 655-658. Describes tests which showed that sulphur chloride gives hydrochloric acid gas as a product of the reaction; that sulphur monochloride is a good reagent for testing the comparative stabilities of transparent lubricating oils; and that sulphur monochloride in carbon disulphide is a good reagent for investigating the nature of bitumens and hydrocarbon oils.

PHYSIOLOGICAL PROPERTIES (530).

682. BURRELL, G. A., and GAUGER, A. W. Exhaust gases make air in closed garage unsafe to breathe. *Nat. Petroleum News*, vol. 8, January, 1917, pp. 62-64. Results of experiments made to determine the amount of carbon monoxide permeating the air of a garage after an automobile engine has been running a short while. Gives analyses of the air in nine cases and gives table showing, under good and bad carburation, the percentage of CO produced by different size engines, and the quantity of air necessary to dilute the exhaust gases to a permissible proportion.
683. MOORE, WILLIAM. Volatility of organic compounds as an index of the toxicity of their vapors to insects. *Jour. Agr. Research*, vol. 10, Aug. 13, 1917, pp. 365-371. Gives results of experiments on various organic compounds, including among the hydrocarbons petroleum ether, gasoline, kerosene, benzene, toluene, xylene, naphthalene, and camphene.
- See also* Nos. 9, 1441.

ANALYTICAL AND TESTING METHODS, DETERMINATION OF PHYSICAL AND CHEMICAL PROPERTIES, APPARATUS, AND PROCEDURE (540).

684. AMERICAN SOCIETY FOR TESTING MATERIALS, PROCEEDINGS. Proposed tentative revision of standard method for distillation of bituminous materials suitable for road treatment. Vol. 17, part 1, 1917, pp. 474-475. Appendix I to report on road materials.
685. ——— Report of Committee D-2 on lubricants. Vol. 17, part 1, 1917, pp. 462-469.
686. ——— Report of Committee D-4 on road materials. Vol. 17, part 1, 1917, pp. 470-473.
687. ——— Report of Sub-Committee XI of Committee D-1, on paint thinners other than turpentine. Vol. 17, part 1, 1917, pp. 402-450. Deals entirely with methods for the determination of flash point and the selection of the most suitable form of tester, with detailed results of tests.
688. ——— Tentative method for the determination of softening point of bituminous materials other than tar products. Vol. 17, part 1, 1917, pp. 811-812. Description of the ring-and-ball method.
689. ——— Tentative tests for lubricants. Vol. 17, part 1, 1917, pp. 767-772. Describes the following tests: Specific gravity, cloud and pour tests, cold test, free acid, carbon residue.
690. ANDERSON, R. P. The determination of gasoline vapor in air. *Jour. Ind. and Eng. Chem.*, vol. 9, Feb. 1, 1917, p. 142. Note published to correct an impression given in an article by Burrell and Robertson (*Jour. Ind. and Eng. Chem.*, vol. 7, 1915, p. 112), that the combustion method for the determination of gasoline may be used successfully when the vapor occurs in large amounts in the air.
691. BOWREY, S. E. The estimation of toluene in crude petroleum. *Jour. Inst. Petroleum Technologists*, vol. 3, June, 1917, pp. 287-304; discussion, pp. 305-322. *Petroleum Rev.*, vol. 36, May 19, 1917, pp. 351-352; June 2, pp. 385-386; June 9, pp. 401-402. Results of an investigation to satisfy the demand for precise information concerning the percentage of benzene and toluene in various crude oils and petroleum spirits, and to solve numerous problems connected with such determination. The extraction of aromatics from petroleum by means of liquid sulphur dioxide served as a basis for the method used. Results are tabulated for crude oil from Trinidad.

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693. CAYEN, R. M. A mercurial viscosimeter. *Jour. Soc. Chem. Ind.*, vol. 36, Mar. 15, 1917, pp. 270-271; discussion, pp. 271-272. A detailed description, with illustration, of a viscosimeter designed to meet the need for an instrument capable of measuring accurately the viscosity of an oil from a small quantity.
- 693a. CHÉNEVEAU, C. Sur la mesure de la viscosité des huiles. (On the measurement of viscosity of oils.) *Jour. de Physique*, vol. 7, May-June, 1917, pp. 109-114. *Chem. Abs.*, vol. 13, Nov. 20, 1919, p. 2805. Describes apparatus for measuring viscosity by the application of Poiseuille's law.
694. CONRADSON, P. H. Emulsification of mineral lubricating oils: Apparatus and test method. *Jour. Ind. and Eng. Chem.*, vol. 9, February, 1917, pp. 166-167. Describes and illustrates a simple laboratory apparatus for determining the emulsibility and demulsification value of lubricating oils. Outlines method of testing, and tabulates results for turbine oil, crank-case oil, engine oil, and spindle oil. Published also in *Proc. Am. Soc. Test. Materials*, vol. 16, part 2, 1916, pp. 273-279.
695. COPE, W. C. A suggested form of viscosimeter. *Jour. Ind. and Eng. Chem.*, vol. 9, November, 1917, pp. 1046. States the principle of the usual form of viscosimeter, and gives three definite points of criticism of instruments so constructed. Describes a centrifugal viscosimeter which is not subject to such criticism.
696. DEAN, E. W. Motor gasoline; properties, laboratory methods of testing, and practical specifications. *Tech. Paper 166*, Bureau of Mines, 1917. 24 pp. Summarizes the properties desirable in gasoline; describes the types of gasoline at present on the market; discusses individual properties which are important, and analytical methods; proposes specifications for motor gasolines, and describes the distillation method and apparatus in detail.
697. DEAN, E. W., and HILL, H. H. Determination of unsaturated hydrocarbons in gasoline. *Tech. Paper 181*, Bureau of Mines, 1917. 25 pp. A study of the experimental methods in common use for measuring degree of unsaturation, and comparison of numerical results of the various methods.
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699. ——— A specific gravity balance for gases. *Bureau of Standards Tech. Paper 89*, 1917. 20 pp. Report of an investigation, made at the request of certain natural gas companies, to determine a more precise method of determining the densities of gases than the effusion method. Describes method selected, apparatus and its operation, and laboratory and field tests made with it. The principle employed is based on the laws of compressibility and buoyant effect of gases. *See also* No. 708.
700. EGLOFF, GUSTAV. The analysis of light oils. *Met. and Chem. Eng.*, vol. 16, Mar. 1, 1917, pp. 259-263. Describes a specially designed apparatus for the rapid and accurate analysis of light oils from the distillation of coal, shale, or petroleum. Gives advantages, and method of using.

701. FOSTER, O. R. Method of weighing volatile petroleum. *Chemist-Analyst*, No. 21, April, 1917, pp. 23-24. Describes apparatus designed for use in large laboratories where a considerable number of calorimetric determinations are made. Its chief advantage is that samples may be weighed with a minimum loss from evaporation.
702. GILL, A. H. Fixed oils, fats, and waxes. A chapter (pp. 566-608) in "Standard Methods of Chemical Analysis," edited by W. W. Scott, New York, Van Nostrand, 2d edition, revised, 1917. 898 pp. Describes tests of petroleum products, such as flash, fire, specific gravity, distillation, sulphur, free acid, and sulphuric acid, for burning oils; and for lubricating oils, viscosity, specific gravity, evaporation, cold test, flash test, and fire test.
703. ——— Gas analysis. A chapter (pp. 687-738) in "Standard Methods of Chemical Analysis," edited by W. W. Scott, 2d edition, revised, 1917. 898 pp. Describes various tests.
704. ——— Gas and Fuel Analysis for Engineers. A compend for those interested in the economical application of fuel. 8th rev. ed. 145 pp. Prepared especially for the use of students at the Massachusetts Institute of Technology.
705. HILDT, E. Nouvel appareil de fractionnement pour les pétroles et autres produits volatils. *Compt. rend.*, t. 165, 1917, pp. 790-793. *Chem. Abs.*, vol. 12, June 10, 1918, p. 1137. Describes apparatus and method of fractionation based on the separation of vaporizable liquids according to their boiling points.
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708. KERR, T. H., and SCHMIDT, E. F. Apparatus to determine specific gravity of gases. *Nat. Gas and Gasoline Jour.*, vol. 11, September, 1917, p. 262. Describes a modified type of weighing instrument, consisting of a water-jacketed balancing chamber, a metal balancing beam, a U gage, a vacuum pump, drying tubes, and a tripod. See also No. 699.
- 708a. KLING, K. (Quantitative estimation of gasoline in natural gas.) *Metan*, vol. 1, 1917, pp. 3-5. *Chem. Zentr.*, Jahrg. 90, 1919, IV, pp. 477-478. *Jour. Soc. Chem. nd.*, vol. 38, Nov. 29, 1919, p. 856A. Gas is measured in a Bunsen gasometer, passed through a drying tube, and condensed in an absorption vessel immersed in a Dewar flask containing a mixture of ether and solid carbon dioxide.
709. LEMP, J. F., and BRODERSON, H. J. A method for the determination of halogens in organic compounds. *Jour. Am. Chem. Soc.*, vol. 39, September, 1917, pp. 2069-2074. The chlorides, bromides, and iodides of a variety of organic compounds were quantitatively determined by fusion with sodium peroxide in a Parr sulphur bomb. The steps necessary for procuring correct results are described.

710. LIDSTONE, F. M. A mercurial viscometer. Jour. Soc. Chem. Ind., vol. 36. Mar. 15, 1917, pp. 270-272. Description of apparatus designed to measure accurately the viscosity of an oil when only a very small amount available, its use and advantages. Applicable especially to lubricating oils.
711. LUKENS, A. R. Distinguishing between petroleum residuums and the various fat pitches. Chemist-Analyst, No. 20, January, 1917, pp. 3-5. Describes method of determining the saponification values of these materials as a means of identifying them.
712. MARDEN, J. W., and DOVER, M. V. The thermal values of the fats and oils. II. The sulphuric acid or Maumene number. Jour. Ind. and Eng. Chem., vol. 9, September, 1917, pp. 858-860. Describes method and apparatus for the determination of the sulphuric acid number, gives results obtained with various oils, including petroleum, and gives specific heats of a series of oils.
713. MERRIAM, E. S. Testing of natural gas for gasoline production. Petroleum Age, vol. 4, May, 1917, pp. 32-34; June, pp. 33-35. Explains absorption and compression methods, stating that the latter is the more logical and satisfactory test method.
714. MEYERS, G. J. Lubricant testing. Jour. Am. Soc. Naval Eng., vol. 29, November, 1917, pp. 698-712. Describes machine built at the U. S. Naval Academy for testing lubricants according to their ability to form a film between the moving parts under a given initial load as soon as possible after motion begins; their ability to maintain a film between the moving parts under the heaviest loads that will be applied; and their endurance or ability to be used again and again. Gives results of specific tests.
715. MOORE, H. K., and RICHTER, G. A. The testing of lubricating oils. Met. and Chem. Eng., vol. 16, June 15, 1917, pp. 692-694. Describes method and apparatus for testing lubricating oils under service conditions, gives curves of experimental results, draws conclusions, and outlines other methods of testing oils with this same apparatus.
716. MURRAY, V. F. Oil-burette for fractional distillation and specific gravity determinations. Canada Dept. Mines, Mines Branch Summary Rept. for 1916 (Ottawa, 1917), pp. 71-73. For dealing with small amounts of oil, and used in the laboratory of the fuel testing station of the Canadian Department of Mines. Description, with diagram.
717. NATIONAL PETROLEUM NEWS. Overlook development of new flash tester. Vol. 9, November, 1917, pp. 50, 52, 54. Describes the work, unknown to the oil industry generally, of development and standardization of the Tagliabue closed cup flash tester by the American Society for Testing Materials and the United States Bureau of Standards. Quotes part of the report of Sub-Committee XI of Committee D-1 of the American Society for Testing Materials on the determination of the relative reliability and suitability of the many types of testers in use, and the selection of the one best suited to the needs of manufacturers and users of volatile and inflammable materials of the class with which this committee deals, i. e., paint thinners other than turpentine. See also No. 735.
718. PETROLEUM WORLD. The differentiation and testing of light motor fuels and their war-time substitutes. Vol. 14, January, 1917, p. 11. Tells of the invention of Dr. Karl Dietrich-Helfenbourg for testing motor spirit at the front.

719. RICHERT, T. G. Fuller's earth and its valuation for the oil industry. *Jour. Ind. and Eng. Chem.*, vol. 9, June, 1917, pp. 599-600. Describes a cheap and quick method for determining in the laboratory the efficiency and economy of fuller's earth for use in filtering, especially as to its bleaching power and its value for absorption of oil. *See also* No. 984.
720. SCOTT, W. W. Standard methods of chemical analysis; a manual of analytical methods and general reference for the analytical chemist and for the advanced student. New York: Van Nostrand, 1917. 2d ed., rev. 898 pp. Contains chapters by A. H. Gill on fixed oils, fats, and waxes and on gas analysis. *See also* Nos. 702, 703.
721. SIEVER, H. L. An apparatus for making the flash and fire tests of lubricating oils. *Chemist-Analyst*, No. 20, January, 1917, pp. 6-7. Describes cheap and convenient tester made of machine steel, its use, and advantages.
722. WALES, H. E. The determination of paraffin in oils. *Chemist-Analyst*, No. 20, January, 1917, pp. 12-13. Explains method applicable to asphalt oils, tarry materials of any kind, and to paraffin base oils.
723. WEISSER, F. L. A convenient apparatus for determining heat efficiency of gas oil. *Am. Gas Eng. Jour.*, vol. 106, May 5, 1917, pp. 441-442. Describes cracking device giving results which closely resemble operating conditions.
724. WOODRUFF, T. L. The analysis of grease mixture. *Chemist-Analyst*, No. 20, January, 1917, pp. 8-11. Gives various tests to be applied to mixtures such as lubricating greases or ointment bases and other preparations containing large amounts of petroleum products.

PATENTS.

725. BRIGGS, C. H. Viscosimeter. U. S. patent 1233177, July 10, 1917.
726. BROWNING, CHARLES, JR. Viscometer. U. S. patent 1244025, Oct. 23, 1917.
727. BURRELL, G. A. Gas analysis. English patent 104179. Application 2119, Feb. 12, 1917. Not accepted.
728. COLLINS, A. L. Method of measuring the viscosity of fluids. U. S. patent 1224142, May 1, 1917.
729. CREWSON, G. G. Method of and apparatus for testing gases. U. S. patent 1245688, Nov. 6, 1917.
730. CROSWELLER, W. W. Instrument for recording percentage volumes of constituent gases. U. S. patent 1229587, June 12, 1917.
731. FLOWERS, A. E. Method and machine for determining viscosity. U. S. patent 1247523, Nov. 20, 1917.
732. HAUPT, HANS, and WERNER, MARTIN. Apparatus for indicating the composition of gases. U. S. patent 1220037, Mar. 20, 1917.
733. HOWARD, W. B. Automatically timed asphalt tester. U. S. patent 1225438, May 8, 1917.
734. PARR, S. W. Adiabatic calorimeter. U. S. patent 1247998, Nov. 27, 1917.
735. TAGLIAHUE, C. J. Closed oil tester. U. S. patent 1236123, Aug. 7, 1917.
See also No. 717.
See also Nos. 636, 643, 646, 652, 653, 654, 664, 665, 667, 668, 675, 676, 679, 736, 739, 746, 748, 750, 756, 1410, 1417.

POWER AND EFFICIENCY TESTS, *see* Nos. 1035, 1056, 1064.

SPECIFICATIONS FOR PURCHASES, ETC. (560).

736. AMERICAN SOCIETY FOR TESTING MATERIALS. PROCEEDINGS. Tentative specifications for asphalt for use in damp-proofing and water-proofing. Vol. 17, part 1, 1917, pp. 712-715. Includes the following tests: Melting point, penetration, ductility, specific gravity, loss on heating, ash, and the carbon bisulphide test.
737. AMERICAN SOCIETY OF CIVIL ENGINEERS. Final report of the special committee on materials for road construction and on standards and tests for their use. Proc. Vol. 43, December, 1917, pp. 2327-2408. Outlines principles to be covered in specifications for road building, bituminous and non-bituminous; gives definitions of terms used in highway work; and recommends (Appendix C) methods for testing bituminous materials. (See also West. Eng., vol. 9, February, 1918, pp. 60-62.)
738. MULLEN, C. A. Specifications for asphalt paving; alternates for native and oil asphalts. Canadian Engineer, vol. 33, Nov. 8, 1917, p. 406.
739. UNITED STATES DEPARTMENT OF AGRICULTURE. Standard forms for specifications, tests, reports, and methods of sampling for road materials. Bull. 555, 1917. 56 pp. Contribution from the Office of Public Roads. As recommended by the first conference of State Highway Testing Engineers and Chemists, Washington, D. C., Feb. 12-17, 1917. Includes tests and specifications for road oils and asphalts.
- See also Nos. 67, 643, 696, 749, 756, 761, 1039, 1408.

VARIOUS SPECIES AND FRACTIONS OF BITUMENS AND PETROLEUMS (570).

GASEOUS PRODUCTS, INCLUDING NATURAL GAS.

740. BIDDISON, P. McD. The reduction in heating value due to recovery of gasoline content very slight. Nat. Gas and Gasoline Jour., vol. 11, August, 1917, pp. 213-214. Data presented to prove that this is true of natural gas after gasoline has been recovered. (See also Burrell, G. A., Biddison, P. M., and Oberfell, G. G. Extraction of gasoline from natural gas by absorption methods. Proc. Nat. Gas. Assoc. of Am., vol. 8, 1916, pp. 415-451; Burrell, G. A., and Seibert, F. M. The condensation of gasoline from natural gas. Bull. 88, Bureau of Mines, 1915.)
741. BURRELL, G. A. Heating value of natural gas after extracting gasoline. Bessemer Monthly, No. 138, June, 1917, pp. 1-2, 4. Discusses the general advantages to the industry in the saving effected by the recovery of the gasoline from natural gas, and shows that the heating value of the gas is lowered very little thereby.
742. BURRELL, G. A., and ROBERTSON, I. W. The compressibility of natural gas and its constituents, with analyses of natural gas from 31 cities in the United States. Tech. Paper 158, Bureau of Mines, 1917. 16 pp.
743. EARHART, R. F. The ratio of specific heats and the coefficient of viscosity of natural gas from typical fields. Trans. Am. Soc. Mech. Eng., vol. 38, 1916 (New York, 1917), pp. 979-987; discussion, pp. 988-994. Published first in Jour. Am. Soc. Mech. Eng., vol. 38, November, 1916, pp. 888-890; discussion, vol. 39, February, 1917, pp. 139-141.

744. EARIHART, R. F., and WYER, S. S. Deviation of natural gas from Boyle's law. *Trans. Am. Soc. Mech. Eng.*, vol. 38, 1916 (New York, 1917), pp. 285-308; discussion, pp. 308-329. Published first in *Jour. Am. Soc. Mech. Eng.*, vol. 38, September, 1916, pp. 695-700; discussion, pp. 700-708.
745. TOOKEY, W. A. Composition of power gases. *Jour. Soc. Chem. Ind.*, vol. 36, Mar. 31, 1917, pp. 309-315; discussion, pp. 315-316. A study of the composition of power gases from the gas engine point of view. Concludes that, while there is no preference among power gases in regard to their relative composition, their purity, pressure, and uniformity are of far more importance than their calorific value.
- See also* Nos. 4, 662, 666, 671, 703, 708, 713, 727, 729, 730, 732, 938, 939, 1013, 1032.

VOLATILE FRACTIONS, INCLUDING MOTOR OILS, GASOLINES, NAPHTHAS, BENZINES.

746. BACON, C. V. Gasolines—analyses and interpretations. *Petroleum Age*, vol. 4, February, 1917, pp. 1-9. Account of an investigation to determine whether or not certain commercial gasolines were suitable for motor purposes, and whether the products manufactured by different organizations were of uniform character. The apparatus (with diagram), and method of operation are described for distillation tests of 20 samples, and the results tabulated. Concludes that gasoline is usually of an even better quality than required for motors. Gives distillation curves for several of the oils tested, with short discussion of each.
747. HANSCOM, W. W. Motor gasoline. *West. Eng.*, vol. 8, December, 1917, pp. 471-473. Discusses requirements for satisfactory gasoline in the economical operation of automobiles, and gives table of results of fractional distillation of several samples of commercial gasolines used in San Francisco.
748. KERR, A. N., JR. Rates gasoline by computed index number. *Nat. Petroleum News*, vol. 9, Dec. 12, 1917, pp. 34, 36. Outlines a new method for finding and expressing quality of gasoline or naphtha. Involves a distillation test, plotting a distillation curve from that test, and measuring the area between the curve and the 560-degree line with a planimeter. From the index figure values can be found for particular products.
749. LEENHOUTS, W. J. Gasoline supply and its relation to specifications. *Quarterly Jour. Univ. North Dakota*, vol. 7, No. 3, April, 1917, pp. 251-260. Discusses the supply of gasoline and its relation to consumption, the properties of modern gasolines, and the bases of possible specifications.
750. LOMAX, E. L. The testing and standardization of motor fuel. *Jour. Inst. Petroleum Technologists*, vol. 4, December, 1917, pp. 6-25; discussion, pp. 26-36. *Petroleum Rev.*, vol. 37, Oct. 20, 1917, pp. 251-252; Oct. 27, p. 269. *Petroleum World*, vol. 14, November, 1917, pp. 477-482. Abstract, *Jour. Soc. Chem. Ind.*, vol. 37, March, 1918, p. 116A. Gives, in tabular form, with their specific gravities and boiling points, the classes of hydrocarbons which may be present in spirits from various sources. Discusses specific gravity tests and distillation tests, and compares the effect on two samples of benzine of different methods of carrying out the latter. Notes the gradual change in motor spirit corresponding to the development of the motor engine, and discusses the detection and determination of sulphur in motor spirit, with description of apparatus for that purpose.

See also Nos. 68, 637, 637a, 661, 666a, 696, 697, 701, 718, 1056, 1065, 1081, 1082, 1372.

LUBRICATING, TRANSFORMER, AND SWITCH OILS.

751. COPELAND, C. W. Cutting oils: Their properties, composition, examination, and industrial application. *Met. and Chem. Eng.*, vol. 17, July 1, 1917, pp. 25-32. Refers to compounded oils used in the metal-cutting industries, and includes mineral oils as constituents of the soluble cutting oils.
752. EVANS, E. A. Chemistry and examination of lubricating oils. *Electrician*, vol. 78, Feb. 23, 1917, pp. 633-634. Abstract of paper before the Diesel Engine Users' Association. A discussion of the properties and composition of lubricating oils.
753. GRAY, R. Oils and greases in common use. *Am. Machinist*, vol. 46, Jan. 25, 1917, pp. 145-146. General discussion of lubricants used in manufacturing.
754. KAUFFMAN, J. L. Straight mineral oil versus compounded oil for the bearings of marine engines not having forced lubrication. *Jour. Am. Soc. Naval Eng.*, vol. 29, February, 1917, pp. 48-32. Gives results of tests made at the engineering experiment station at Annapolis. Conclusions are in favor of straight mineral oil.
755. NATIONAL PETROLEUM NEWS. Maker of good core oil must know foundry practice. Vol. 9, July, 1917, pp. 60, 62. Discusses the requirements of core oil, and the use of mineral oils in compounding it.
756. WINSTON, H. T. Navy lubricants and lubrication. *Jour. Am. Soc. Naval Eng.*, vol. 29, May, 1917, pp. 239-261. Discusses very fully the kinds, properties, tests, purchase, etc., of oils used as lubricants for machinery, and more briefly, the characteristics of lubricants for cutting tools, greases, graphite, and miscellaneous lubricants. An appendix gives specifications and tests of oils.
- See also Nos. 68, 636, 639, 641-652, 654, 655, 681, 685, 689, 694, 710, 714, 715, 721, 724, 1015, 1436, 1437, 1450.

GAS AND FUEL OILS, ABSORPTION OILS, PETROLEUM RESIDUUMS.

757. DOWNING, R. C., and POHLMAN, E. F. A study of gas oils. *Proc. Am. Gas Inst.*, 1916 (published 1917), vol. 1, pp. 588-626; discussion, pp. 627-636. *Am. Gas Light Jour.*, vol. 105, Nov. 13, 1916, pp. 318-319, 322-330. Discusses methods for their evaluation, and the results of cracking gas oils in atmospheres of various gases.
758. HARRINGTON, JOSEPH. Oil and powdered coal as fuels. *Power Plant Eng.*, vol. 21, Sept. 15, 1917, pp. 736-738. From paper before the International Railway Fuel Association. Discusses characteristics of these fuels, methods of burning, and comparative costs.
759. SHUTTLEWORTH, LANCE. Benzene absorption oils in practice and analysis. *Gas World*, vol. 67, Sept. 1 1917. Coking and By-Products Section, p. 11. Discusses the efficiency and necessary properties in absorption oils, including petroleum oils.
- See also Nos. 711, 723, 1035, 1049.

MONTAN WAX.

760. MARCUSSEN, J., and SMELKUS, H. (Montan wax and its behavior on distillation.) *Chem. Ztg.*, Jahrg. 41, 1917, pp. 129-136. *Jour. Soc. Chem. Ind.*, vol. 36, May 31, 1917, p. 540. *Chem Abs.*, vol. 11, Dec. 10, 1917, pp. 3453-3454.
- See also Nos. 4, 635, 657, 692.

ASPHALT, TARS, ETC.

761. ADAM, C. F. Importance of inspection of paving materials. *West. Eng.*, vol. 8, August, 1917, pp. 293-295. Relates facts in cases of inadequate inspection, and points out the economy of using more care in this respect.
762. HIXSON, A. W., and HANDS, H. E. Some relations of the effect of overheating to certain physical and chemical properties of asphalts. *Jour. Ind. and Eng. Chem.*, vol. 9, July, 1917, pp. 651-655. Results of an investigation to determine to what extent an asphalt can be heated without altering those properties that are desirable for a durable pavement.
763. MABERY, C. F. Relations in composition of the different forms of bitumens. *Jour. Am. Chem. Soc.*, vol. 39, September, 1917, pp. 2015-2027. Results of a study of the similarity between the distillation products of Ohio bituminous coal and a neighboring petroleum; between the constituents of Utah gilsonite and the heavy varieties of petroleum; and between the hydrocarbons derived from grahamite and those from gilsonite.
- See also* Nos. 4, 304, 684, 686, 688, 692, 706, 722, 736, 737, 738, 739, 967, 1408, 1410, 1415, 1416, 1417.

SHALES, MISCELLANEOUS SOLID BITUMENS, LAMPBLACK, AND COKE.

See Nos. 4, 6, 681.

MISCELLANEOUS (590).

764. CHARITSCHKOV, K. (Determination of free alkali in petroleum soaps.) *Nephthanoje Djelo*, 1916, No. 13. *Chem. Ztg.*, Jahrg. 41, 1917, Rep., p. 102. *Jour. Soc. Chem. Ind.*, vol. 36, May 31, 1917, p. 557. *Chem. Abs.*, vol. 11, Oct. 10, 1917, p. 2737. The aqueous solution of soap is treated with copper sulphate or ferrous ammonium sulphate, the naphtheric acid dissolved in petroleum spirit, the residue of iron oxide or copper oxide determined, and calculated into the corresponding amount of free alkali.
765. REEVE, C. S., and LEWIS, R. H. The effects of exposure on some fluid bitumens. *Jour. Ind. and Eng. Chem.*, vol. 9, August, 1917, pp. 743-746. Gives in detail results of exposures of crude petroleum, oil asphalt, and petroleum residuum, concluding that polymerization and intermolecular reactions induced by heat, and possibly increased by the action of light, are largely responsible for the changes which occur, beside those due to simple evaporation.

REFINING AND REFINERIES (600).

PROCESSES AND PRACTICES (610).

766. DEPPÉ, W. P. Solving the gasoline problem. Jour. Soc. Automotive Eng., vol. 1, December, 1917, pp. 353-359; discussion, pp. 359-362. Extracts in Automotive Industries, vol. 37, Nov. 29, 1917, pp. 971-972. and Nat. Petroleum News, vol. 9, Dec. 12, 1917, pp. 50, 52, 54, 56, 58, 60. Is a popular discussion of methods of refining oils in distillation plants; compares cracking reactions with carburation and combustion in internal-combustion engines.
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BITUMEN FUELS FOR INTERNAL-COMBUSTION ENGINES.

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